HITACHI INVERTER

J100 E5 SERIES

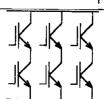
INSTRUCTION MANUAL

Single phase input 200V class Three phase input 400V class

Power Drive Services Ltd.

Unit 1, Victoria St. Ind. Est. Leigh, Lancs, WN7 5SE Tel: 01942 260206

Fax: 01942 260525 Web:- www.inverter.co.uk



After reading this manual, keep it at hand for future reference.

Hitachi, Ltd.

Tokyo Japan

NB526X

SAFETY

For the Best Results with J100 Series inverter, read this manual and all of the warning sign attached to the inverter carefully before installing and operating it, and follow the instructions exactly. Keep this manual handy for your quick reference.

Definitions and Symbols

A safety instruction (message) is given with a hazard alert symbol and a signal word; WARNING or CAUTION. Each signal word has the following meaning throughout this manual.



This symbol means hazardous high voltage. It used to call your attention to items or operations that could be dangerous to your and other persons operating this equipment.

Read these message and follow these instructions carefully.



This is the "Safety Alert Symbol.." This symbol is used to call your attention to items or operations that could be dangerous to your or other persons operating this equipment. Read these messages and follow these instructions carefully.



WARNING

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Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.



CAUTION

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Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage of product.

The matters described under <u>A CAUTION</u> may, if not avoided, lead to serious results depending on the situation. Important matters are described in **CAUTION** (as well as **WARNING**), so be sure to observe them.

NOTE

NOTE: Notes indicate an area or subject of special merit, emphasizing either the product's capabilities or common errors in operation or maintenance.



HAZARDOUS HIGH VOLTAGE

Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, there might be exposed components with cases or protrusions at or above line potential. Extreme care should be taken to protect against shock.

Stand on an insulating pad and make it a habit to use only one hand when checking components. Always work with another person in case an emergency occurs. Disconnect power before checking controllers or performing maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on an electronic controllers or rotating electrical equipment.

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⚠ WARNING This equipment has high leakage current and must be perminatly hard wired to earth via two independent cable.

⚠ MOTORS

- a) Class I motor must be connected to protective earth via low resistive path ($< 0.1\Omega$)
- b) Any motor used must be of suitable rating.
- c) Motors may have hazardous moving parts, in this event suitable protection must be provided.

⚠ CAUTION

Alarm connection may contain hazardous live voltage even when inverter is disconnected. In case of removing flont cover for maintenance or inspection, confirm that incoming power for alarm connection is surely disconnected.

⚠ CAUTION

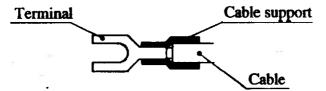
Hazardous (main) terminals for any interconnection (motor, contact breaker, filter etc) must be inaccesible in end installation.

⚠ CAUTION

This equipment should be installed in an enclosure meeting reguirements of IP4X(see EN60529). The end application must be in accordance with BS EN60204-1(with reference to manual page4-1 and 4-2, the diagram measurements to be suitably amended).

⚠ CAUTION

Cnnection to field wiring terminals must be reliably fixed having two independent means of support. Using terminal with cable support (figure below), or cable gland, cable clamp etc.



⚠ CAUTION

A double pole disconnection device must be fitted to the incoming mains supply close to theinverter. Additionally, a protection device meeting IEC947-1/IEC947-3 must be fitted at this point(protection device data shown in page 5-8)

The above instructions together wiht any other requirements highlighted in this manual must be complied with for continued LVD compliance.

PRECAUTIONS FOR EMC (Electro Magnetic Compatibility)

It is required to satisfy the EMC directive (89/336/EEC) when using J100 inverter in EU country. To satisfy EMC directive and to comply with standard, the followings should be kept.

⚠ WARNING:

This equipment should be installed, adjusted and serviced by qualified personal familiar with construction and operation of the equipment and the hazards involved. Failure to observe this precaution could result in bodily injury.

- 1. Power supply to J100 inverter
 - 1) Voltage fluctuation ±10% or less.
 - 2) Voltage unbalance \pm 3% or less.
 - 3) Frequency variation ± 4% or less.
 - 4) Voltage distortion THD=10% or less.

2. Installation

- 1) Use filter designed for J100 inverter.
- 2) Install the filter and inverter into locked cabinet meeting requirements of IP4X.

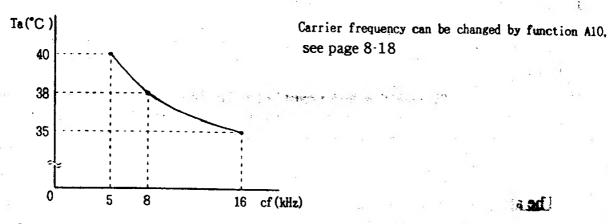
3. Wiring

- 1) Sielded wire(screened cable) is required for motor wiring, and length is less than 50m.
- 2) Length is 20m to 50m, carrier frequency must be setting 5kHz.
- 3)Separate the main circuit wiring from signal/process circuit wiring.

4.Environment condition

When using a filter, keep the following condition.

① Ambient temperature and carrier frequency



- ② Humidity: 20 to 90% RH (no dew condensation)
- ③ Vibrations: $5.9 \text{ m/s}^2 (0.6G) 10-55 \text{Hz}$
- 4 Location: 1000 meter or less altitude, indoor (no corrosive gus or dust)

Power Drive Services Ltd, WWW. Inverter. Es. UK

Revision History Table

No.	Revision Contents	The Date of Issue	Operation Manual No.
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1. SAFETY PRECAUTIONS

1. Installation

A CAUTION	
Be sure to install the unit on flame resistant material such as metal. Otherwise, there is a danger of fire.	p. 4-1
Be sure not to place anything inflammable in the vicinity. Otherwise, there is a danger of fire.	p. 4-1
Be sure not to let the foreign matter enter such as cut wire refuse, spatter from welding, iron refuse, wire, dust, etc. Otherwise, there is a danger of fire.	
Be sure to install it in a place which can bear the weight according to the specifications in the text (4. Installation). Otherwise, it may fall and there is a danger of injury.	
Be sure to install the unit on a perpendicular wall which is not subject to vibration. Otherwise, it may fall and there is a danger of injury.	p. 4-1
Be sure not to install and operate an inverter which is damaged or parts of which are missing. Otherwise, there is a danger of injury.	p. 4-1
Be sure to install it in a room which is not exposed to direct sunlight and is well ventilated. Avoid environments which tend to be high in temperature, high in humidity or to have dew condensation, as well as	p. 4-1
places with dust, corrosive gas, explosive gas, inflammable gas, grinding-fluid mist, salt damage, etc. Otherwise, there is a danger of fire.	
Be sure that the wall surface is a nonflammable material, such as steel plate.	p. 4-2

2. Wiring

<u></u> WARNING	
Be sure to ground the unit. Otherwise, there is a danger of electric shock and/or fire.	p. 5-1
 Wiring work shall be carried out by electrical experts. Otherwise, there is a danger of electric shock and/or fire. 	p. 5-1
 Implement wiring after checking that the power supply is off. It might incur electric shock and/or fire. 	p. 5-1
 After installing the main body, carry out wiring. Otherwise, there is a danger of electric shock and/or injury. 	р. 5-1

A CAUTION

Make sure that the input voltage is:
 Single phase 220 to 240 V 50/60 Hz
 Three phase 380 to 415 V/50 Hz, 400 to 460 V/60 Hz

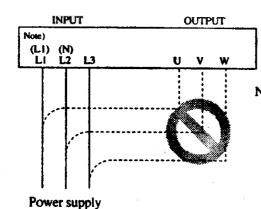
- -

.....p. 5-2

Be sure not to input a single phase to a 3 phase type.
 Otherwise, there is a danger of fire.

- p. 5-2
- Be sure not to connect AC power supply to the output terminals (U, V, W).
- . p. 5-2

Otherwise, there is a danger of injury and/or fire.



Note: L1, N: Single phase 220 to 240V 50/60 Hz L1, L2, L3: Three phase 380 to 415V/50 Hz

400 to 460V/60 Hz

- Fasten the screws with the specified fastening torque. Check so that p. 5-2 there is no loosening of screws.

 Otherwise, there is a danger of fire.
- Remarks for using earth leakage circuit breakers in the mains supply: Frequency inverters with CE-filters (RFI-filter) and screened motor cables have a higher leakage current against earth. Especially in the moment of switching on this can cause unintentional triggerings of earth leakage circuit breakers. Because of the rectifier on the input side of the inverter there is the possibility to stall the switch-off function through amounts of DC-current. The following should be observed:

Only short time-invariant and pulse current-sensitive earth leakage circuit breakers with higher trigger current should be used.

Other components should be secured with separate earth leakage circuit breakers.

Earth leakage circuit breakers in front of an inverter are not an absolute protection against direct touching.

- Be sure to set the fuse(s) (the same phase as the main power supply)
 in the operation circuit.
 Otherwise, there is a danger of fire.
- As for motor leads, earth leakage breakers and electromagnetic contactors, be sure to use the equivalent ones with the specified capacity (rated).

Otherwise, there is a danger of fire.

3. Control and operation

⚠ WARNING	
 Be sure to turn on the input power supply after mounting the surface cover. While being energized, be sure not to remove the cover. Otherwise, there is a danger of electric shock. 	p. 6-1
 Be sure not to operate the switches with wet hands. Otherwise, there is a danger of electric shock. 	p. 6-1
 While the inverter is energized, be sure not to touch the inverter terminals even during stoppage. Otherwise, there is a danger of electric shock. 	p. 6-1
 If the retry mode is selected, it may suddenly restart during the trip stop. Be sure not to approach the machine. (Be sure to design the machine so that personnel safety will be secured even if it restarts.) Otherwise, there is a danger of injury. 	p. 6-1, p. 8-24
 Even if the power supply is cut for a short period of time, it may restart operation after the power supply is recovered if the operation command is given. If it may incur danger to personnel, be sure to make a circuit so that it will not restart after power recovery. Otherwise, there is a danger of injury. 	p. 6-1
 The Stop Key is effective only when the function is set. Be sure to prepare the Key separately from the emergency stop. Otherwise, there is a danger of injury. 	p. 6-1
 After the operation command is given, if the alarm reset is conducted, it will restart suddenly. Be sure to set the alarm reset after checking the operation command is off. Otherwise, there is a danger of injury. 	p. 6-1 p. 7-13
 Be sure not to touch the inside of the energized inverter or to put a bar into it. Otherwise, there is a danger of electric shock and/or fire. 	p. 6-1
	p. 7-4
 When the Stop key function is ineffective, pressing the Stop key does not cancel the stop and trip. Be sure to provide an emergency stop switch separately. When the operation command destination is a digital operator, this selection es ineffective. 	p. 8-27

⚠ CAUTION		
 Radiating fin and discharging resistor will have high temperature. Be sure not to touch them. Otherwise, there is a danger of getting burned. 	•••••	p. 6-2
 Low to high speed operation of the inverter can be easily set. Be sure to operate it after checking the tolerance of the motor and machine. Otherwise, there is a danger of injury. 	•••••	p. 6-2
 If a motor is operated at a frequency higher than 60Hz, be sure to check the speeds of the motor and the machine with each manufacturer, and after getting their consent, operate them. Otherwise, there is a danger of machine breakage. 	**********	p. 6-2
 Check the following before and during the test run. Otherwise, there is a danger of machine breakage. Was the short-cut bar between +1 and + removed? Was the direction of the motor correct? 	••••••	p. 6-4
 Was the inverter tripped during acceleration or deceleration? Were the rpm and frequency meter correct? Were there any abnormal motor vibrations or noise? 		

4. Maintenance, inspection and part replacement

WARNING

When removing connectors, never pull the wires. (Wires for cooling p. 11-1 fan and thermal relay)
 Otherwise, there is a danger of fire due to wire breakage and/or injury.

5. Others

WARNING

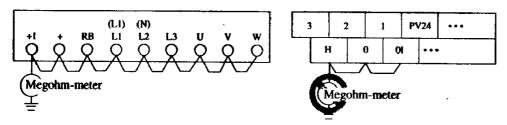
1 Never modify the unit.

Otherwise, there is a danger of electric shock and/or injury.

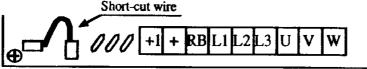
N CAUTION

Withstand voltage tests and insulation resistance tests (megger tests) are executed before the units are shipped, so that there is no need to conduct these tests before operation.

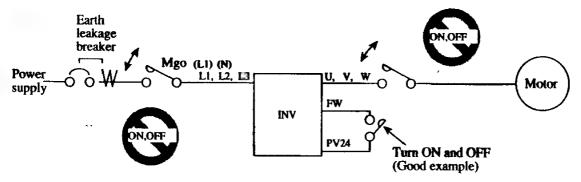
When conducting megger tests as a part of daily inspection, be sure that these tests are only executed between the main circuit and the ground. Do not execute megger tests on the control circuit.



Remove short wiring on the power PCB before conducting the test. And be sure to attach short wiring after the test. (for 400V class only)



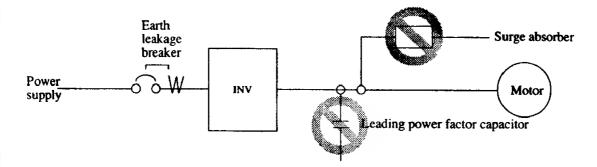
- Do not attach or remove wiring or connectors when power is applied. Also, do not check signals during operation.
- 1 Do not stop operation by switching off the electromagnetic contactors on the primary or secondary sides of the inverter.



When there has been an instantaneous power failure, and if an operation instruction has been given, then the unit may restart operation after the power failure has ended. If there is a possibility that such an occurrence may harm humans, then install an electromagnetic contactor (Mgo) on the power supply side, so that the circuit does not allow automatic restarting after the power supply recovers. If the optional remote operator is used and the retry function has been selected, this will also cause automatic restarting when an operation instruction has been input, so please be careful.

CAUTION

• Do not insert leading power factor capacitors or surge absorbers between the output terminals of the inverter and the motor.



- Be sure to ground the grounding terminal, \(\begin{aligned} \equiv \equiv \).
- When inspecting the unit, after turning the power supply off be sure to wait unitl the CHARGE lamp beside the control terminal is off before opening the cover.

(If the lamp is lit or still flickering, then the internal capacitor's residual voltage is still dangerous.)

MOTOR TERMINAL SURGE VOLTAGE SUPPRESSION FILTER (FOR THE 400 V CLASS)

In a system using an inverter of the voltage control PWM system, a surge voltage caused by the cable constants such as the cable length (especially when the distance between the motor and inverter is 10 m or more) and cabling method may occur at the motor terminal.

A dedicated filter of the 400 V class for suppressing this surge voltage is available, Please order one.

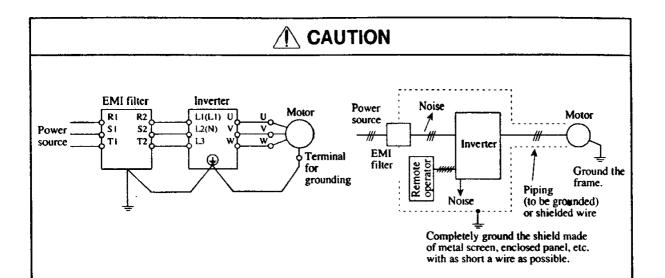
• PROTECTION AGAINST NOISE INTERFERENCE FROM INVERTER

The inverter uses many semiconductor switching elements such as transistors and IGBTs. Thus, a radio set or measuring instrument located near the inverter is susceptible to noise interference.

To protect the instruments from erroneous operation due to noise interference, they should be installed well apart from the inverter. It is also effective to shield the whole inverter structure.

Addition of an EMI filter on the input side of the inverter also reduces the effect of noise from commercial power line on external devices.

Note that external dispersion of noise from the power line can be minimized by connecting an EMI filter on the primary side of inverter.



EFFECTS OF DISTRIBUTOR LINES ON INVERTERS

In the cases below involving a general-purpose inverter, a large peak current flows on the power supply side, sometimes destroying the converter module. Where such situations are foreseen, or the paired equipment must be highly reliable, install an AC reactor between the power supply and the inverter.

- (A) The unbalance factor of the power supply is 3% or higher.
- (B) The power supply capacity is at least 10 times greater than the inverter capacity (and the power supply capacity, 500 kVA or more).
- (C) Abrupt power supply changes are expected. Examples:
 - (1) Several inverters are interconnected with a short bus.
 - (2) A thyristor converter and an inverter are interconnected with a short bus.
 - (3) An installed phase advance capacitor opens and closes.

In cases (A), (B) or (C), we recommend installing an AC reactor of 3% (in a voltage drop at rated current) with respect to the supply voltage on the power supply side.

- When occurring an EEPROM error ([E] [B]), be sure to confirm the setting value again.
- When setting b contact to the reverse command ([REV] terminal), the inverter state automatically. Do not set to b contact.

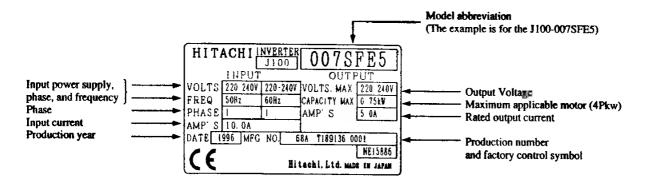
GENERAL CAUTION

In all the illustrations in this manual, covers and safety devices are occasionally removed to describe the details. When the product is operated, make sure that the covers and safety devices are placed as they were specified originally and operate it according to the instruction manual.

2. INSPECTION UPON UNPACKING

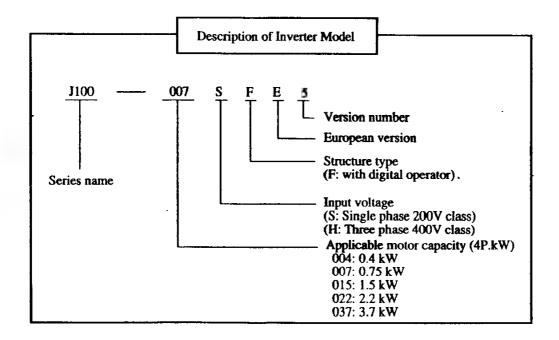
Before installation and wiring, be sure to check the following:

- Make sure that there was no damage during transportation the unit.
- After unpacking the unit, make sure that the package contains one inverter and one operation manual
- Make sure that the product is the one you ordered by checking the specifications label on the front of the cover.



Contents of Specifications Label

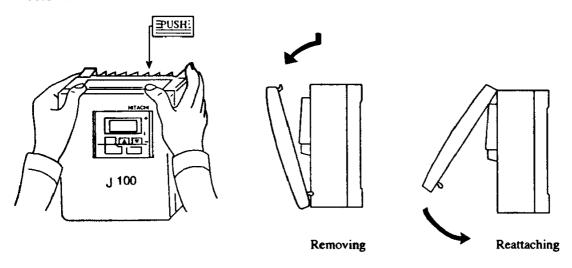
If you discover any problems, contact your sales agent immediately.



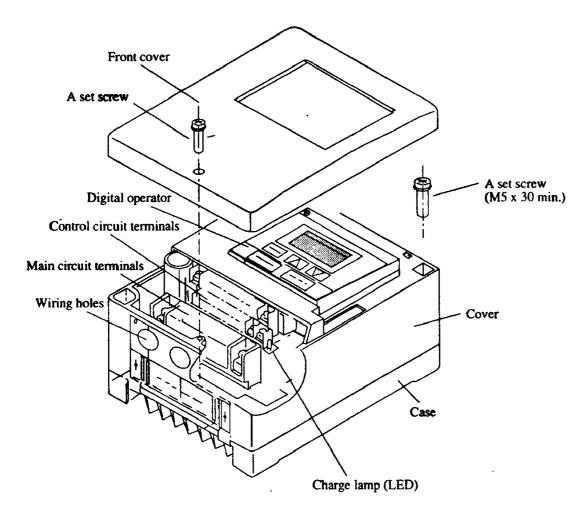
3. APPEARANCE AND NAMES OF PARTS

3.1 Removing and reattaching the front cover

After removing the screws for attaching the front cover, the cover can be removed as shown below:



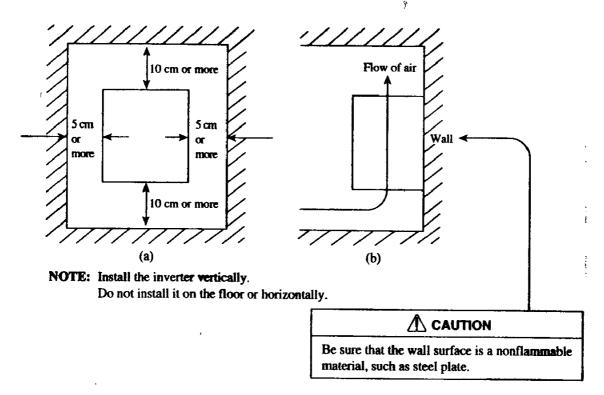
3.2 Names of parts



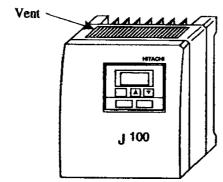
! CAUTION

- Be sure to install the unit on flame resistant material such as metal. Otherwise, there is a danger of fire.
- Be sure not to place anything inflammable in the vicinity. Otherwise, there is a danger of fire.
- Be sure not to let the foreign matter enter such as cut wire refuse, spatter from welding, iron refuse, wire, dust, etc.
 Otherwise, there is a danger of fire.
- Be sure to install it in a place which can bear the weight according to the specifications in the text (4. Installation).
 Otherwise, it may fall and there is a danger of injury.
- Be sure to install the unit on a perpendicular wall which is not subject to vibration. Otherwise, it may fall and there is a danger of injury.
- Be sure not to install and operate an inverter which is damaged or parts of which are missing.
 - Otherwise, there is a danger of injury.
- Be sure to install it in a room which is not exposed to direct sunlight and is well ventilated. Avoid environments which tend to be high in temperature, high in humidity or to have dew condensation, as well as places with dust, corrosive gas, explosive gas, inflammable gas, grinding-fluid mist, salt damage, etc. Otherwise, there is a danger of fire.

For cooling purposes, be sure that the inverter is installed vertically. In addition, be sure that it is separated from other components and walls. If foreign matter is introduced into the interior of the inverter, this may cause malfunctions, so make sure that no foreign matter can enter it.



During wiring or other work, do not allow any wire scraps, welding fragments, iron scraps, dust, etc. to enter into the inverter, therefore be sure to cover the top of the inverter before working.



⚠ Be sure to check the ambient temperature (-10 to 40°C).

NOTE 1

The higher the ambient temperature inside the inverter, the shorter its life will be. If a heat generating unit is used near the inverter, try to keep it as far away as possible. Also, when installing the inverter in a box, be sure to carefully consider ventilation and the dimensions.

See the mounting dimension diagram for details (PAGE 12-6).

⚠ Be sure to install the inverter in a locked enclosure meeting the requirements of IP4X (see EN60529).

NOTE 1: For EMC directive and Low Voltage directive, do not remove the front cover.

NOTE 2: The end application must be in accordance with BS EN60204-1.

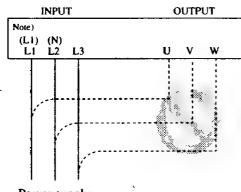
MARNING

- Be sure to ground the unit.
 Otherwise, there is a danger of electric shock and/or fire.
- Wiring work shall be carried out by electrical experts.
 Otherwise, there is a danger of electric shock and/or fire.
- Implement wiring after checking that the power supply is off. It might incur electric shock and/or fire.
- After installing the main body, carry out wiring.
 Otherwise, there is a danger of electric shock and/or injury.

⚠ CAUTION

- Make sure that the input voltage is: Single phase 220 to 240 V 50/60 Hz
 Three phase 380 to 415 V/50 Hz, 400 to 460 V/60 Hz
- Be sure not to input a single phase to a 3 phase type. Otherwise, there is a danger of fire.
- Be sure not to connect AC power supply to the output terminals (U, V, W).

Otherwise, there is a danger of injury and/or fire.



Note: L1, N: Single phase 220 to 240V 50/60 Hz L1, L2, L3: Three phase 380 to 415V/50 Hz 400 to 460V/60 Hz

Power supply

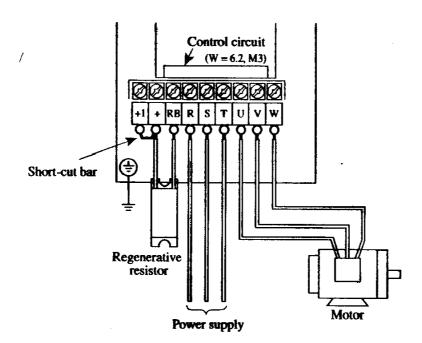
- Fasten the screws with the specified fastening torque. Check so that there is no loosening of screws.
 - Otherwise, there is a danger of fire.
- Remarks for using earth leakage circuit breakers in the mains supply:

Frequency inverters with CE-filters (RFI-filter) and screened motor cables have a higher leakage current against earth. Especially in the moment of switching on this can cause unintentional triggerings of earth leakage circuit breakers. Because of the rectifier on the input side of the inverter there is the possibility to stall the switch-off function through amounts of DC-current. The following should be observed:

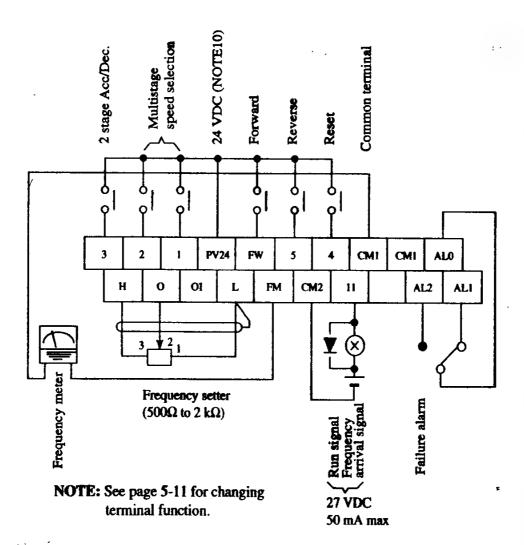
- Only short time-invariant and pulse current-sensitive earth leakage circuit breakers with higher trigger current should be used.
- Other components should be secured with separate earth leakage circuit breakers.
- Earth leakage circuit breakers in front of an inverter are not an absolute protection against direct touching.
- Be sure to set the fuse(s) (the same phase as the main power supply) in the operation circuit.
 - Otherwise, there is a danger of fire.
- As for motor leads, earth leakage breakers and electromagnetic contactors, be sure to
 use the equivalent ones with the specified capacity (rated).
 Otherwise, there is a danger of fire.
- Double pole disconnection device must be fitted to the incoming mains supply close to the inverter. And protection device meeting IEC947-1/IEC947-3 must be fitted at this point.
- Connection to wiring terminal must be reliabily fixed with two means of support.

5.1 Wiring the power supply and motor

The terminal board will be exposed when the front cover is removed. Wire the inverter in this state.

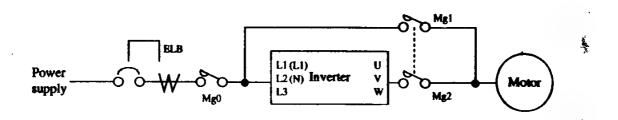


- The inverter will be damaged if the power supply is connected to the motor terminals U, V and W, so be sure not to make any mistakes.
- If multiple motors are to be connected, be sure to attach a thermal relay to each motor.
- See the page 5-8 on the terminal dimensions.
- Make sure that the wiring is:
 Single phase 220 to 240 V/50 Hz, 60 Hz(L1), (N) terminals.
 Three phase 380 to 415 V/50Hz, 400 to 460 V/60 HzL1, L2, L3.
- Make sure that the short-cut bar which has been attached in advance between terminals +1 and + is not removed except when the DC Reactor is being mounted.



Control circuit terminal diagram

NOTE 1: When changing the power supply of the motor between the inverter and commercial power, be sure to install mechanically interlocked switches Mg1 and Mg2.

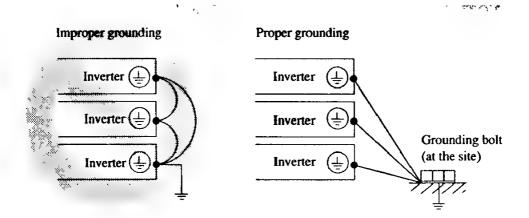


NOTE 2: Install an earth leakage breaker at the input of the inverter. (Select an earth leakage breaker whose sensitive current level is raised in high frequency range.)

When the cable between the inverter and motor is more than 10 m long, the thermal relay may malfunction due to high-frequency waves. To prevent this, install an AC reactor on the output side of the inverter or use a current sensor rather than a thermal relay.

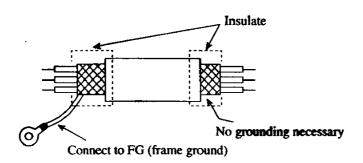
NOTE 3: Be sure that the specified grounding is carried out. Be sure to separate the unit's grounding pole from those of other heavy electric machinery, and avoid using common grounding poles.

If multiple inverters are used, make sure that the grounding connections do not create a loop.

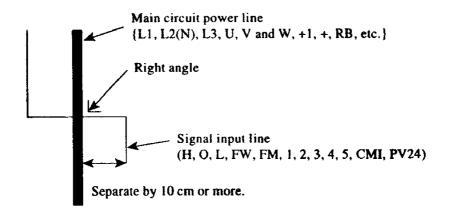


NOTE 4: When a frequency arrival signal is used, be sure to install a surge absorbing diode in parallel with the relay. Otherwise, the surge voltage created when the relay goes ON or OFF may damage the AR output circuit.

NOTE 5: Use a twisted and shielded wire for the signal line, and cut the shielded covering as shown in the diagram below. Make sure that the length of the signal line is 20 meters or less. If the line must be longer than 20 meters, please use a VX application control device RCD-A (remote control device) or CVD-E (insulated signal converter).



- NOTE 6: When the frequency setting signal is turned on and off with a contact, use a relay which will not cause contact malfunctions, even with the extremely weak currents and voltages, such as crossbar twin contacts, etc.
- NOTE 7: Use relays which do not have contact defects at 24 V DC, 3 mA for the other terminals.
- NOTE 8: Separate the main circuit wiring from the relay control circuit wiring. If they must cross, be sure that they cross at a right angle.



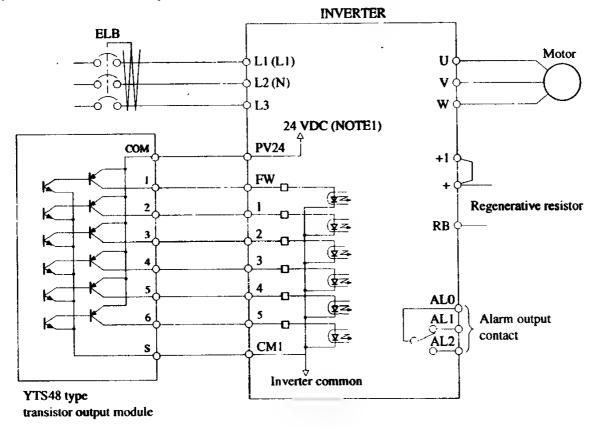
- NOTE 9: Insulate frequency analog command input terminal L from the common terminal for peripheral devices such as the programmable controller.
- NOTE10: Do not short circuit the terminals PV24 and CM1 by mistake.

 The control power supply may cause a failure.
- NOTE11: Do not short-circuit the terminals H and L.

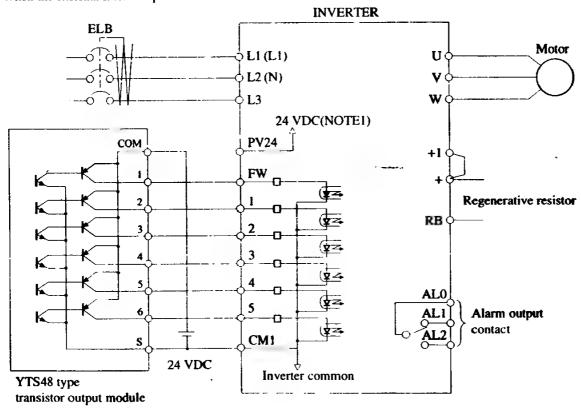
 The control power supply may cause a failure.

Connection to the Programmable Controller

(1) When the internal interface power source is used



(2) When the external interface power source is used



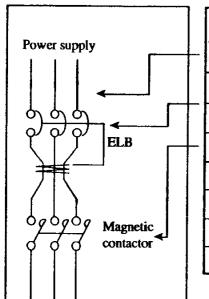
NOTE 1: Do not short circuit the terminals PV24 and CM1 by mistake. The control power supply may cause a failure.

5.2 Wiring Equipment, Options

CAUTION: Provide the wiring equipment in accordance with the safety codes required by jurisdictional authorities.

The table below is an example selected out of the Hitachi's standard distribution equipment.

If specified in the standard or laws and regulations, follow their instructions.



Motor	Inverter	Wirit	ng	Applicable equipment			
output (kW)	model	Power lines	Signal lines	Earth leakage breaker (ELB)	Electromagnetic contactor		
0.4	J100-004SFE5	1.25 mm²	(*) 0.75 mm²	EX30(10A)	H20		
0.75	J100-007SFE5	2 mm ²	Shielded	EX30(15A)	H20		
1.5	J100-015SFE5	2 mm ²	wire	EX30(20A)	H20		
2.2	J100-022SFE5	2 mm ²		EX30(30A)	H20		
1.5	J100-015HFE5	2 mm²		EX30(10A)	H10C		
2.2	J100-022HFE5	2 mm ²		EX30(15A)	H20		
3.7	J100-037HFE5	2 mm ²		EX30(15A)	H20		

NOTE 1: The applicable equipment is for a Hitachi standard four pole squirrel-cage motor.

NOTE 2: Be sure to consider the capacity of the circuit breaker to be used.

NOTE 3: Be sure to use bigger wires for power lines if the distance exceeds 20 m.

NOTE 4: Install an earth leakage breaker meeting requirements of IEC947-1/IEC94 at the input.

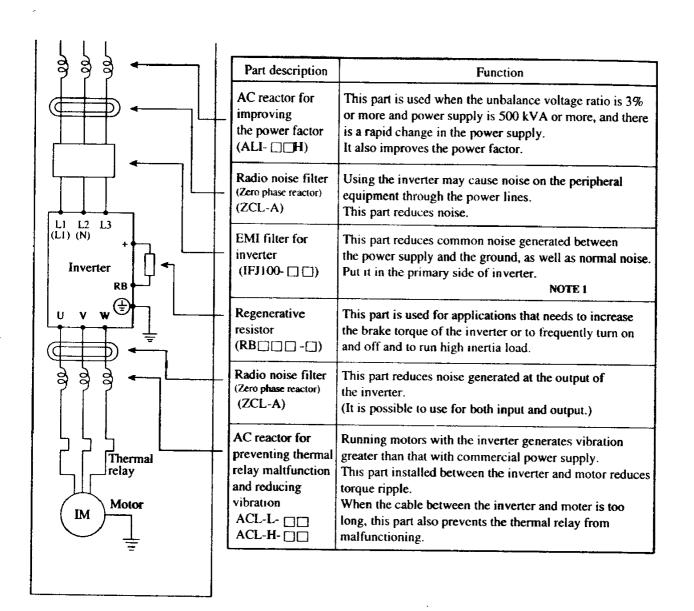
(*) Use 1.25 mm² wire for the alarm signal wire.

Classify the detective current of the earth leakage breaker depending on the total distance between the inverter and the motor.

1	Detective current (mA)
100 m and less	30
300 m and less	100
600 m and less	200

NOTE 1: When using CV wire and metal tube, the leakage current is around 30 mA/km.

NOTE 2: When using CV wire and met tube, the leakage current becomes eight times because IV wires have a high dielectriconstant.



NOTE 1: IFJ100 series filter is required for EMC directive, but others are not for this purpose.

Reactor and others of the above table except EMI filter are for general use for noise reduction.

. 12.17

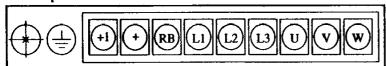
5.3 Terminal

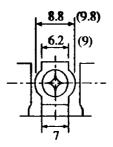
Main circuit terminal

Single phase 220 to 240 V 50/60 Hz



Three phase 380 to 415 V 50 Hz/400 to 460 V 60 Hz





Main circuit terminal

Note: Value inside () for 015 and 022SFE5, 015 to 037HFE5

Control circuit terminal

3	3	2	2	1		PV	24	F	w	4	5	4		Cì	4 1	C	ИI	Al	LO	
	H	I	()	0	1	I	,	F	М	Cl	12	1	1			Al	L.2	Al	LI

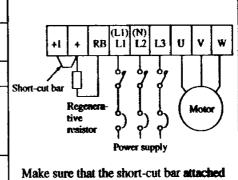
	Screw diameter	Width (mm)
Main circuit	M4	8.8 (9.8)
Control circuit	М3	6.2 (9)
Grounding	M4	

Main circuit

Terminal symbol	Terminal description	Function	
L1 L2 L3 (L1), (N)	Main power	Connect the power supply	
U,V,W	Inverter output	Connect the motor	
+1	External DC Reactor	Usually the short-cut bar is attached between terminals +1 and +. When the DC Reactor is to be connected, be sure to remove the short-cut bar.	S
+,RB	External regenerative resistor	Connect a regenerative resistor (option)	
	Gowand	Ground (connect arounding to avoid	ĺ

electric shock)

Dimension



Make sure that the short-cut bar attached between +1 and + is not removed except when the DC Reactor is to be mounted.

Tightening torque

Screw	Tightening torque
М3	0.5 N·m (max. 0.7 N·m)
M4	0.5 N·m (max. 0.7 N·m)

Control circuit

	Terminal	Terminal description and function		Remarks
	symbol		Initial setting	
Input signal	FW	Forward operation		Dry contact
	5	Intelligent input terminals 1 to 5	Reverse running command	Close: ON (run) Open: OFF (stop)
	4	(Note 1) Reverse running Initialization USP function command	Reset input (Note 2)	Min. ON time:
	3	Multustage speed 2nd setting Reset (First stage) function	2 stage acc/dec. time	12 ms or more
	2	Multistage speed 2 stage acc./dec. Terminal	Multistage speed (Second stage)	
	1	Multistage speed Free run stop (Third stage) External DC External trip Damping one of the above is selected.	Multistage speed (First stage)	
	PV24	Common for input signals		Output current: max. 100 mA
Monitor signal	FM	Analog frequency monitor/Digital frequency monitor/Analog output current monitor	Analog frequency monitor	
	CM1	Common for monitor		
Frequency command input	Н	Power supply for frequency command		5 VDC
	0	Voltage frequency command		0-5 VDC (nominal) 0-10 VDC (nominal) (Input impedance 30 kΩ)
	OI	Current frequency command		DC 4-20 mA (nominal) Input impedance 250Ω
	L	Common for frequency command		
Output signal	11	Intelligent output terminal One of frequency arrival signal, RUN signal, and Overload advance notice signal is selected.	Frequency arrival signal	27 VDC 50 mA max
	CM2	Common for output		
Fault alarm output	AL0	1 IATAL 1	Contact rating	load)/Min 100 VAC
	AL1	AL2 AL1 Abnormal, Power off: 2 AL0-AL1 open	0.2 A (cosø=0.4) 10 mA	
	AL2		10ad) 5 VDC 100 mA	

NOTE 1: USP: Prevention function of restart upon power on.

NOTE 2: The reset terminal cannot be changed from "a contact" (NO) to "b contact" (NC).

NOTE 3: When the software is to be locked by the terminal 3 in the same way as

with the J100E2 series, it is necessary to switch the terminal. (See page 7.14.)

6.1 Before Starting Operation

Prior to the test run, check the following.

N WARNING

900 31 31

- Be sure to turn on the input power supply after mounting the surface cover. While being energized, be sure not to remove the cover.
 Otherwise, there is a danger of electric shock.
- Be sure not to operate the switches with wet hands. Otherwise, there is a danger of electric shock.
- While the inverter is energized, be sure not to touch the inverter terminals even during stoppage.
 Otherwise, there is a danger of electric shock.
- If the re-try mode is selected, it may suddenly restart during the trip stop. Be sure not to approach the machine. (Be sure to design the machine so that personnel safety will be secured even if it restarts.)

 Otherwise, there is a danger of injury.
- Even if the power supply is cut for a short period of time, it may restart operation after the power supply is recovered if the operation command is given. If it may incur danger to personnel, be sure to make a circuit so that it will not restart after power recovery.
 - Otherwise, there is a danger of injury.
- The Stop Key is effective only when the function is set. Be sure to prepare the Key separately from the emergency stop.

 Otherwise, there is a danger of injury.
- After the operation command is given, if the alarm reset is conducted, it will restart suddenly. Be sure to set the alarm reset after checking the operation command is off.
 Otherwise, there is a danger of injury.
- Be sure not to touch the inside of the energized inverter or to put a bar into it. Otherwise, there is a danger of electric shock and/or fire.

A CAUTION

- Radiating fin and discharging resistor will have high temperature. Be sure not to touch them.
 - Otherwise, there is a danger of getting burned.
- Low to high speed operation of the inverter can be easily set. Be sure to operate it after checking the tolerance of the motor and machine.

 Otherwise, there is a danger of injury.
- If a motor is operated at a frequency higher than 60Hz, be sure to check the speeds of the motor and the machine with each manufacturer, and after getting their consent, operate them.
 - Otherwise, there is a danger of machine breakage.

Note:

- (1) Make sure that the power lines (input power supply L1(L1), L2(N) and L3, and output terminals, U, V and W are connected correctly.
- (2) Make sure that there are no mistakes in the signal line connections.
- (3) Make sure that the inverter case $(\frac{1}{z})$ is grounded.
- (4) Make sure that terminals other than those specified are not grounded.
- (5) Make sure that the inverter is installed vertically on a wall, and a nonflammable material such as a steel plate is used as a mounting surface.
- (6) Make sure that there are no short-circuits caused by stray pieces of wire, solderless terminals or other objects left from wiring work. Also, make sure that no tools have been left behind.
- (7) Make sure that the output wires are not short-circuited or grounded.
- (8) Make sure that there are no loose screws or terminals.
- (9) Make sure that the maximum frequency setting matches the machine specifications.
- (10) With the digital operator removed, do not operate the inverter. Make sure that the digital operator or remote operator is connected before operating the inverter.

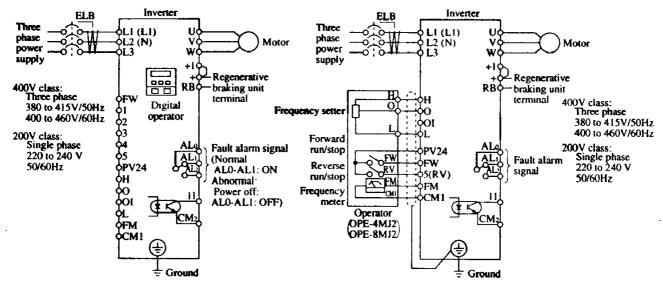
Be sure to refer to page 11-2 when conducting insulation resistance and withstand voltage tests. Never test terminals other than those which are indicated.

6.2 Test Run

An example of a general connection diagram is shown below.

Operating with digital operator:
When setting frequency, run and stop with digital operator.
(The same way as remote operator (DOP) or copy with (DRW).)

Running from external command: When setting frequency, run and stop from external command (FW,RV Terminal.) The following shows run from the operation box (OPE-4MJ2,OPE-8MJ2)



Procedure(Operating with digital operator)

- (1) Turn on ELB to supply power to the inverter. Make sure that the POWER LED on the digital operator goes ON.
- (2) Make sure that \boxed{F} is changed to \boxed{DD} , or \boxed{DC}
- (3) Press twice and display F 2
- (4) Set frequency with . Check the output frequency and direction of revolution.
- (5) Press and start to run.

 (Short circuit FW to PV24 or 5(RV) to PV24 when F 9 is set to 02.
- (6) Press (中止/サセット and decelerate to a stop.

/ CAUTION

Check the following before and during the test run. Otherwise, there is a danger of machine breakage.

- Was the short-cut bar between +1 and + removed?
- Was the direction of the motor correct?
- Was the inverter tripped during acceleration or deceleration?
- Were the rpm and frequency meter correct?
- Were there any abnormal motor vibrations or noise?

When overcurrent tripping or overvoltage tripping occurs during the test run, increase the acceleration time or deceleration time.

Factory settings

Maximum frequency: 50 Hz Forward operation

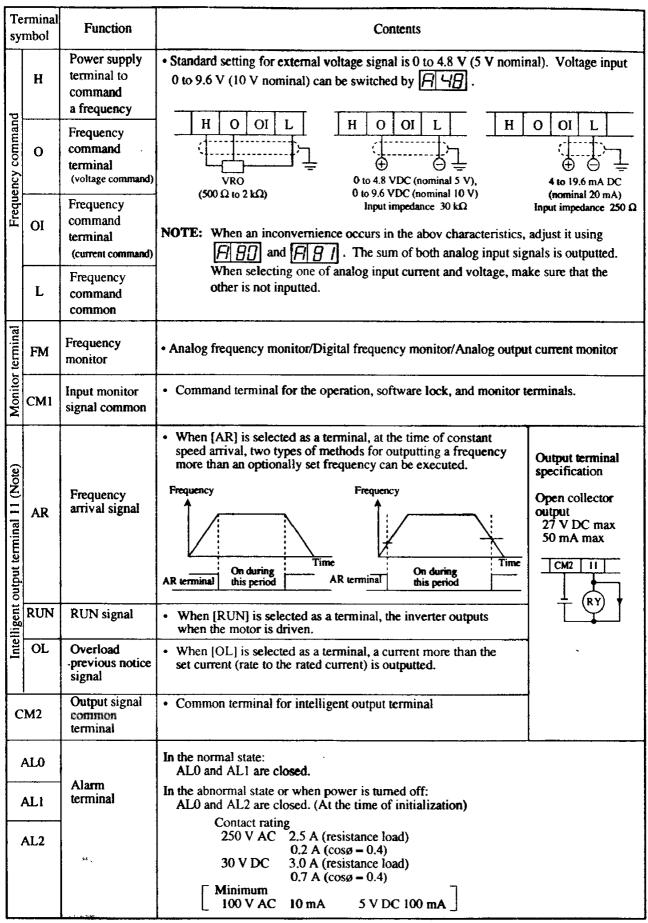
123

7. FUNCTION OF CONTROL CIRCUIT TERMINAL

7.1 List of Control Circuit Terminals

The initialization of the intelligent input terminals is "a contact" (they turn on when short-circuited). When they are to be used in the b contact state, it is necessary to switch the setting by [[]].

Terminal symbol		Function		Contents		
FW		Forward run/stop		SWF Contact (close): Forward run (open): Stop SWR Contact (close): SWF SWR SWF ON OFF OF OFF SWP OFF ON OFF		
Intelligent input termin	5	Reverse runt/stop) 	Reverse run (open): Stop Terminal 5: REV Both contacts SWF and SWR are close-stop.		
	1	pad	SWI	Frequency (Hz) Fourth speed Third Speed Second Second Frequency Sw3 Sw2 Sw1 SwF SwR Condition (Terminal 1: CF1 Terminal 2: CF2 Terminal 3: CF3 Terminal 5: REV		
	2	Multistage speed	SW2	First speed Switch Switch ON		
	3	Ŷ	SW3	SW2 ON		
	DB	Externa braking		When the terminal [DB] is turned on, the DC braking operation can be performed.		
	STN	Initializ	ation	This function is used for initialization (state which is set at factory before shipment). When the terminal [STN] is turned on and the equipment is reset or the power is turned on again, the equipment will be initialized.		
	SET	2nd setting function		When the terminal [SET] is turned on, the set frequency, torque boost, acceleration and deceleration time, second acceleration and deceleration time, and control system can be changed in a batch.		
	2CH	2 stage acceleration and deceleration		When the terminal [2CH] is turned on, the acceleration and deceleration can be executed by the 2 stage acceleration and deceleration time.		
	FRS			When the terminal [FRS] is turned on, the inverter stops output and the motor enters the free run state.		
	EXT			When the terminal [EXT] is turned on, the inverter enters the trip state, stops output, and displays E12.		
	USP			When the terminal [USP] is turned on, the restart when the power is turned on with the running command kept on can be prevented.		
	RS	Reset		When the terminal [RS] is turned on, the trip state can be canceled. During running, the output is stopped. NOTE: The function cannot be used in the b contact state.		
	SFT	Softwar	e lock	lock When the terminal [SFT] is turned on, the data of each function is locked. However, the running monitor and frequency setting are valid.		
P	V24	24 V DC power source		Common terminal for running terminal or intelligent terminal		
C	M 1	Common terminal 1		Common terminal for monitor terminal		
	7-1					



NOTE: "b contact" is set by initialization for terminal 11. When "a contact" is to be used, switch the contact setting by [[-2]].

Terminal name: Monitor terminal [FM] (Analog, digital)

Function No. to be set

A 50, A 51, and F 10

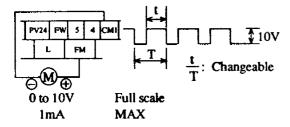
Function contents

Monitor output frequency signal or the current of the inverter is output from the control circuit terminal.

Monitor output current signal is output as an analog signal only.

① Analog Frequency Monitor Signal

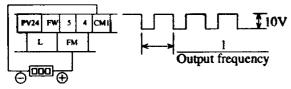
The meter outputs duty cycle in proportion to the output frequency with full scale at the maximum frequency.



NOTE: This is a dedicated indicator, so that it cannot be used as a line speed signal.

Indication accuracy after adjustment: About ±5% (The accuracy of some meters may exceed this value.)

② Digital Frequency Monitor Signal Pulse train of a frequency which is the same as the output frequency is output. The duty is about 50%.



3 Analog Current Monitor Signal

The duty cycle in proportion to the output current with full scale at 200% of the rated current of the inverter.

Specification of analog meter follows the

analog frequency monitor specifications.

Setting contents

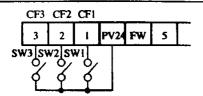
- I. Select Frequency Monitor or Current Monitor by [A 51].
- When Frequency Monitor is selected, select
 Analog Meter or Digital Meter by A 50.
 (When Current Monitor is selected, analog
 data is outputted even if Digital Meter is
 selected.)
- 3. When the analog meter is used, adjust the meter so that the needle of the meter indicates the maximum value at the time of maximum frequency by F 10 (analog meter adjustment).

7-3

7.3 Function Contents of Intelligent Input Terminals

Terminal name: Reverse running/stop terminal [REV]	Function No. CO to C 4 to be set
• When the running command is inputted via the terminal [REV], the terminal executes the reverse running command or stop command. Terminal setting method Digital operator [REV] terminal setting (This is set in the terminal 5 at the time of initialization.) Set the set value [Reverse running command] 0 in one of the input terminals C 0 to C 4.	When the power is turned on when the running command is on, the motor starts rotation and it is dangerous. Before turning the power on, confirm that the running command is not on. Precautions When the running command is inputted via the forward running terminal [FW] and reverse running terminal [REV] at the same time, the running command enters a state which is the same as stop. Note that when the [REV] terminal is set to "b contact", the running automatically starts.
Terminal name: Multispeed [CF1], [CF2], [CF3]	Function No. C 0 to C 4. F 2 to be set A 12 to A 17, A 17
 When [CF1], [CF2], and [CF3] are selected as intelligent input terminals, Multispeed 1 to Multispeed 7 can be set. When the frequency command from the normal operator (or terminal) is combined with them, up to 8 stages of running are available. When the control terminal is set at each speed by the switch, the numerical value displayed at F 2 indicates the output frequency at the time of each multispeed. Set the speed as shown below. 1 Turn the running command off. 2 Turn each switch on and set it to Multispeed n. Display the data section of F 2. 3 Set an optional output frequency by pressing the and keys. 	

Example of output terminal connection

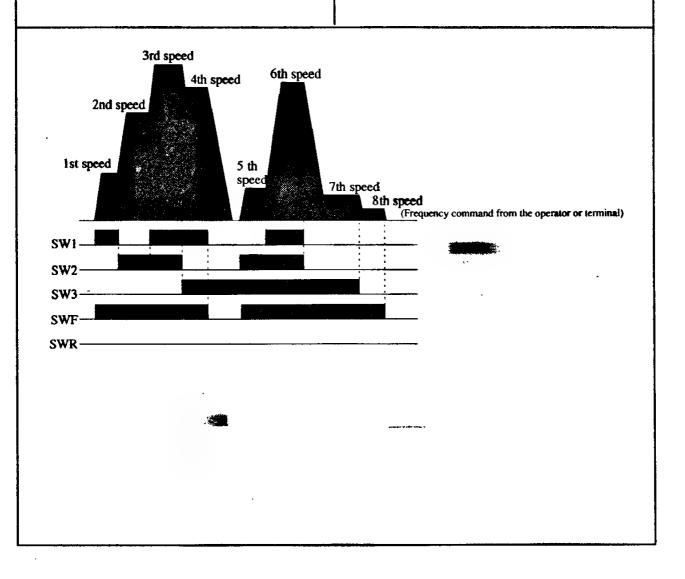


Setting of multispeed

M-14:	Cont	Control circuit terminal						
Multispeed	SW1	SW2	SW3					
Multispeed 1	ON	OFF						
Multispeed 2	OFF	ON	OFF					
Multispeed 3	ON	ON	1					
Multispeed 4	ON	OFF	<u> </u>					
Multispeed 5	OFF	ON	0.7					
Multispeed 6	ON	ON	ON					
Multispeed 7	OFF	OFF	1					

Precautions

- Up to the third speed of the multispeed can be set by initialization. When CF3 (allocated to the terminal 3 in this case) is set by the extended function mode C 2, up to the seventh speed can be set.
- After any data is changed, be sure to press
 the wife key every time and then set the
 next one. Note that when the FUNC key is
 not pressed, no data will be set.
- When a frequency more than 120 Hz is to be set, it is necessary to switch the maximum frequency (A 64).



Terminal name: External DC damping [DB]

to be set

Function No. C 0 to C 4 A 21, A 22, A 56

Function content

When the terminal [DB] is turned on, the DC braking [DB] operation can be performed.

Necessary setting items when the external DC braking terminal is used

Set the following when the external DC braking terminal is to be used.

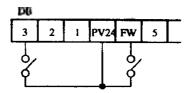
- ① A 56 DC braking type selection
- ② A 21 DC braking force setting
- 3 A 22 DC braking time setting

DC braking execution method

When the operation type is an edge operation Turn the switch between [DB] and [PV24] on and output DC braking only

for the time of A 22 DC braking time selection (at the time of stop).

When the operation type is a level operation Output DC braking when the switch between [DB] and [PV24] is on. Time setting is not related to it.



When [DB] is allocated to the terminal 3

Precautions

As the DC braking force and DC braking time are increased, overload protection (E 5) is easily generated.

Terminal setting method

Digital operator

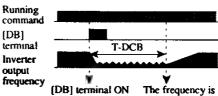
Set the set value 4 in one of the input terminals C 0 to C 4.

Level operation 1



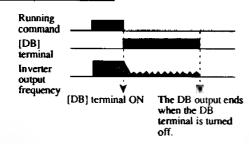
outputted again to release the DB

Edge operation 1

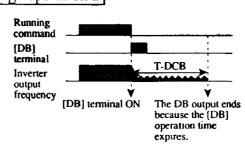


outputted again because the [DB] operation time expires.

Level operation 2



Edge operation 2



Terminal name:	Initialization (factory delivery state) [STN]	Function No. to be set	C 0 to C 4
When returning the following	equipment to the initial state at fact procedure.	ory before shipme	ent for some reason,
© Turn the switch be on or perform the turn the power on 3 When 6 seconds of turn the switch be	set value5) to one of the input ended function mode to set an inteller tween the [STN] and [PV24] term a reset operation as shown in Note 1 again before the charge lamp of the or more pass after the power is turn etween the [STN] and [PV24] term wer turning operation is performed to the charge operation as the charge operation is performed to the charge operation is performed to the charge operation as the charge operation are charged operation as the charge operation as the charge operation are charged operation.	ligent terminal.) ninals on and then l. (After the powe ne logic substrate g ned on or the reset inals off. (When t	turn the power off and er is turned off, do not goes off.) operation is performed, he key operation, reset
block on	tting, turn the switch between the [land then off, he software is locked, the equipment		

Terminal name: 2nd setting function

Function No.

C	0	o [4	Œ	1	0
to	A	2.	A	18],	A	19,
A	62,	A	163	0.0	7	2],
F	5 1	oI	7	8)			

Function content

- When the terminal [SET] is turned on, it is possible to set two types of motor constants and execute running by one inverter.
- Select the second setting function when the equipment is stopped.

Functions which can be set by the second function

F2: Output frequency setting

F5: V/f pattern setting

F6: Acceleration time 1 setting

F7: Deceleration time 1 setting

F8: Manual torque boost setting

A0: Control method

A1: Motor capacity setting

A2: Motor poles setting

A18: 2-stage acceleration time setting

A19: 2-stage deceleration time setting

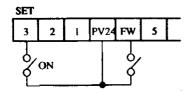
A62: Base frequency setting

A63: Maximum frequency setting

Function switching method

While the switch between the set terminals [SET] and [PV24] is on, the equipment is operated by the setting of the second function.

When the terminal is turned off, the setting is returned to the original setting (first function).



When [SET] is allocated to the terminal 3

How to set the monitor and function modes when the second function is executed

- To set the second set data, change the setting in the state that [SET] and [PV24] are turned on.
- Even when the [SET] terminal is switched during data display, the digital operator displays the same value and does not display the switched set data. When the display code is displayed, switch the [SET] terminal.
- In the digital operator, at the time of second setting, a decimal point is displayed in the first digit place of the data display section such as 22. However, when the acceleration and deceleration time, DC braking time adjustment time, and standby time after undervoltage display more than 100, it does not mean the second function setting. (When the remote operator is used for setting, there is no distinction display of the second setting. Confirm it from the state of ON or OFF of the terminal.)

Terminal setting method

Set the set value	6 in one of the input
terminals [C 0] to	C 4.

Precautions

 Connect and turn on the [SET] terminal before the running command terminals (FW and REV terminals). When they are connected and turned on at the same time, the setting may not be switched to the second setting.

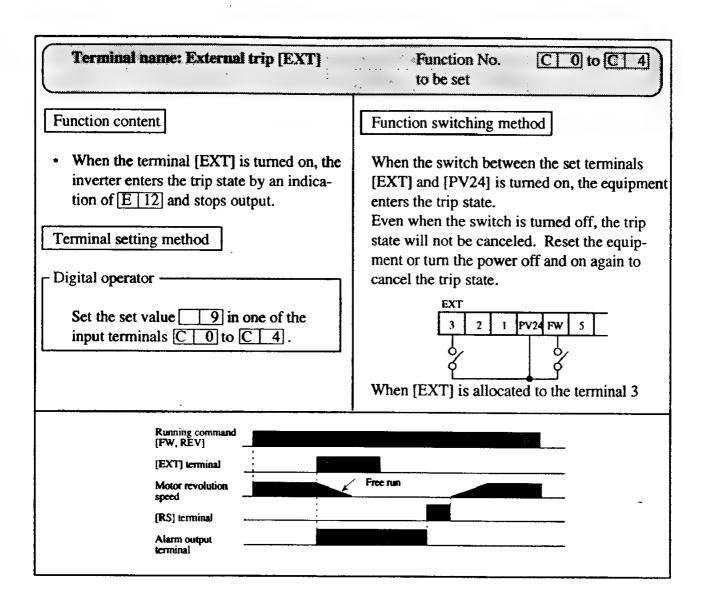
Terminal name: Second stage acceleration Function No. C 0 to C 4. A 18, A 19 and deceleration [2CH] to be set Function content 2 stage acceleration and deceleration time setting method When the terminal [2CH] is turned on, the equipment can be accelerated or deceler-Use A 18 (acceleration time 2) and A 19 ated (acceleration time 2, deceleration (deceleration time 2) to set the 2 stage acceltime 2) by the 2 stage acceleration and eration and deceleration time (acceleration deceleration time. time 2, deceleration time 2). Function switching method Between terminals [2CH] Acceleration and deceleration time and [CM1] for operation OFF state Acceleration time 1, While the switch between the set termi-Deceleration time 1 nals [2CH] and [PV24] is on, the equip-ON state Acceleration time 2, Deceleration time 2 ment operates by the 2 stage acceleration and deceleration time (acceleration time Precautions 2, deceleration time 2). • When the terminal is turned off, the When a time of more than 1000 seconds is set equipment is returned to the original by the remote operator, the indication of the acceleration and deceleration time (acceldigital operator becomes _____. (However, eration time 1, deceleration time 1). the operation during the set time will be executed.) 1 PV24 FW 5 Running commune [FW, REV] [2CH] terminal When [2CH] is allocated to the terminal 3 Output frequency Terminal setting method Digital operator

Set the set value $\boxed{}$ in one of the input terminals $\boxed{}$ $\boxed{}$ to $\boxed{}$ $\boxed{}$ $\boxed{}$.

Function No. C 0 to C 4 Terminal name: Free run stop [FRS] to be set Function content Terminal setting method • When the terminal [FRS] is turned on, the Digital operator inverter stops output and the motor enters the free run state. Set the set value 8 in one of the input terminals C 0 to C 4. Function switching method Running While the switch between the set termi-[FW, REV] nals [FRS] and [PV24] is on, the equip-[FRS] ment operates the FRS operation. 0 frequency start revolution 1 PV24 FW speed When [FRS] is allocated to the terminal 3 **NOTE:** "a contact" is set by initialization. When "b contact" is to be used, switch the contact setting by C 20. The contact setting cannot be

switched only by selecting FRS by

switching C 0 to C 4



Terminal name: Prevention function of restart upon power on [USP]

Function No. to be set

CI 0	to C	4

Function content

- If the running command is set when power is turned on, the inverter starts running immediately after it is activated. The USP function prevents it so that the inverter will not execute sudden running.
- To reset an alarm and restart running, turn the running command off (Note 1) or perform a reset operation by the terminal [RS] or the #此/ツセット STOP/RESET key.
 Refer to the time chart indicated below.

NOTE 1: When the running command is turned off, the indication is switched to Err but the trip state will not be canceled.

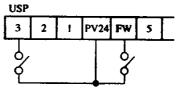
Set content

Digital	operator	

Set the set value 10 in one of the input terminals C 0 to C 4.

Function switching method

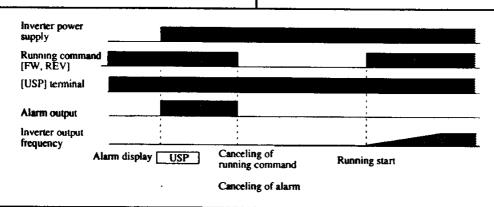
While the switch between the set terminals [USP] and [PV24] is on, the equipment executes the USP operation. If the power is turned on when the running command is inputted, the equipment enters the USP trip state (E 13).



When [USP] is allocated to the terminal 3

Precautions

- Note that when a USP error occurs and it is canceled by resetting in the state that the running command from the terminal is inputted, the inverter restarts running immediately.
- Even when the trip state is canceled by turning the terminal [RS] on and off after an insufficient voltage protection (E 9) occurs, this function will be performed.
- When the running command is inputted immediately after the power is turned on, a USP error will be caused. When this function is used, input the running command two (2) seconds after the power is turned on.



Terminal name: Reset [RS]

to be set

Function No. C 0 to C 4

Function content

- The trip content can be canceled.
- The function is used to return each setting to the initialization (state which is set at factory before shipment). See page 7-7, "Initialization".
- The function is used to erase the trip history data. Set A 57 trip history clear selection.

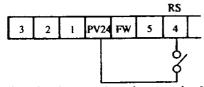
Terminal setting method

- Digital operator -

Set the set value III in one of the input terminals C 0 to C 4.

Function switching method

When the switch between the set terminals [RS] and [PV24] is turned on and off, the equipment executes the reset operation. (Reset [RS] is allocated to the control terminal 4 by initialization.)



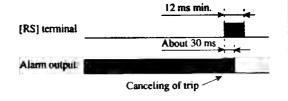
When [RS] is allocated to the terminal 4 (Initialization)

WARNING

After the operation command is given, if the alarm reset is conducted, it will restart suddenly. Be sure to set the alarm reset after checking that the operation command is off. Otherwise, there is a danger of injury.

Precautions

- When the control terminal [RS] is kept on continuously for more than 4 seconds before using it, the display of the remote operator becomes R-ERROR COMM<2> (the display of the digital operator is []]. However, the inverter is normal. To return the display to the original one, open the terminal [RS] and press one of the keys of the operator.
- When the [RS] terminal is turned off from on, it becomes valid.
- The (中止/リセット STOP/RESET) key of the digital operator is valid only when an alarm occurs.
- Only "a contact" (NO) can be set to the [RS] terminal. The terminal cannot be used in the "b contact" (NC) state.
- Even when the power is turned off or on, the function of the terminal is the same as that of the reset terminal.



Terminal name: Terminal software lock [SFT]

Function No. to be set

* 1	n	to (~ 1 /
~ 1	v	10:3	
		* ***	******

Function content

 When the terminal [SFT] is turned on, the data of all the functions except the output frequency is locked by initialization.
 When the data is locked, no data can be changed.

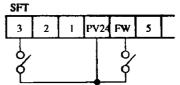
Terminal setting method

- Digital operator -

Set the set value 12 in one of the input terminals 0 to 4.

Function switching method

When the switch between the set terminals [SFT] and [PV24] is turned on, the equipment enters the software lock state.



When [SFT] is allocated to the terminal 3

Precautions

- When the [SFT] terminal is turned on by initialization, only the output frequency can be changed.
- Software lock can be made possible also for the output frequency by A 53.
- Software lock by the operator is also possible without the [SFT] terminal being used.
 (A 84)

Mr. 1 Pr

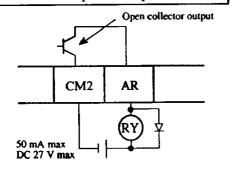
7.4 Function Contents of Intelligent Output Terminals (Initial setting is "b contact ' (NC) state)

Terminal name: Frequency arrival signal [AR] Function No. C 10, A 39, to be set A 40, A 49

Function content

• When [AR] is selected as an intelligent output terminal, at the time of constant speed arrival, two types of methods for outputting a frequency more than an optionally set frequency can be executed. Select the output method by A 49. Set an optionally set frequency by A 39 (setting at the time of acceleration) or A 40 (setting at the time of deceleration).

Connection example of output terminal



Terminal setting method

- Digital operator

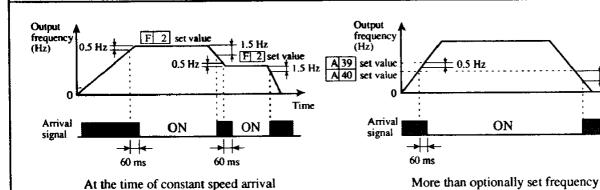
Set the set value $\boxed{}$ in the output terminal $\boxed{C \ 10}$.

Precautions

- At the time of acceleration, an output signal at a frequency between the set frequency
 0.5 Hz to + 1.5 Hz is turned on.
- At the time of deceleration, an output signal at a frequency between the set frequency
 + 0.5 Hz to - 1.5 Hz is turned on.

1.5 Hz

Time



NOTE: When an arrival signal is outputted, a delay of about 60 ms occurs.

Terminal name: Run signal [RUN] Function No. C 10 to be set Function content Terminal setting method When [RUN] is selected as an intelligent - Digital operator · output terminal, the inverter outputs a RUN signal when the motor is driven. Set the set value in the output terminal C 10. Connection example of output terminal Precautions Open collector output A RUN signal is outputted simultaneously when a gate signal of the power module is CM2 RUN outputted. Therefore, when the frequency of the RUN signal is less than the start frequency adjustment value A 4, it will 50 mA max DC 27 V max not be outputted. A RUN signal can be outputted even during DC braking by A 52. FW (REV) A4Inverter output frequency RUN ON

C 10 Terminal name: Overload advance notice Function No. signal [OL] to be set *300 : Function content Terminal setting method When an output current more than the set - Digital operator current (rate to the rated current) flows, Set the set value 2 in the output the terminal outputs a signal. terminal C 10. Connection example of output terminal Precautions Open collector output A value of 150% is set by initialization. To change the level, change A 30 (overload CM2 OL advance notice level). x . ef to . = 50 mA max DC 27 V max Power running A 30 OL

Terminal name: Alarm terminal

[AL1, AL2-AL0]

Function No.

C 21

to be set

Function content

 When an alarm occurs, the function outputs an alarm signal from the terminals [AL0], [AL1], and [AL2] via the c contact. If this occurs, the operator displays the alarm content.

Terminal setting method

Digital operator

- "a contact" or "b contact" can be selected by C 21.
- The initialization is "b contact".

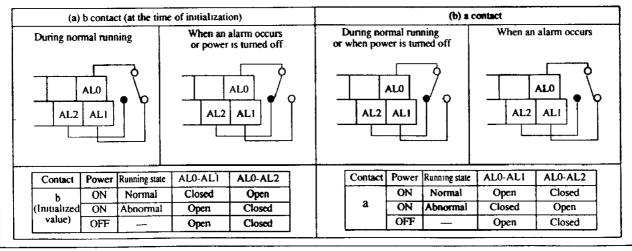
Precautions

- Holding of an alarm signal When an alarm signal is outputted, the alarm content will be stored even if the input power is turned off. Therefore, by turning the power on again, the content can be confirmed. However, when the input power is turned off, the alarm output will be reset (canceled) when the power is turned on again next. Therefore, to hold the alarm output, hold the alarm once by the external sequence and then turn the power switch of the inverter off.
- When the alarm contact output is set ON during normal running (b contact), a time delay occurs until the contact is closed when the power is turned on. Therefore, when the alarm contact output is to be used, set a delay of about 2 seconds when the power is turned on. (In the case of b contact, the contact may chatter when the power is turned on or off. If a fault may be caused by this, provide an interlock in the external circuit.)

Contact specification

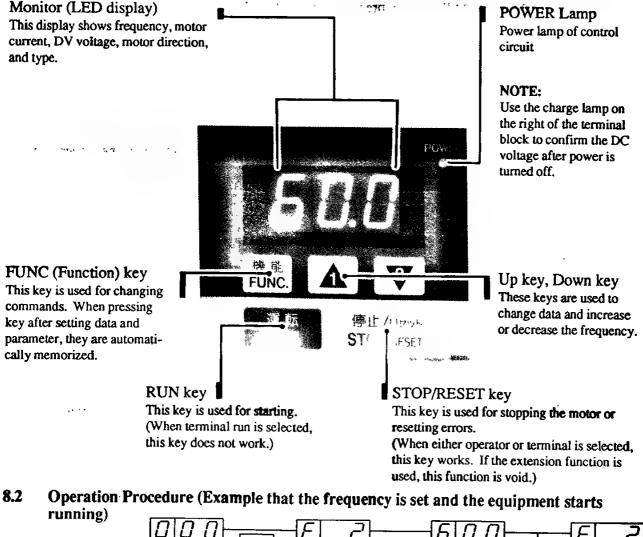
Maximum	Minimum
AC 250V, 2.5A (load R) 0.2A (cosø=0.4)	AC 100 V, 10 mA
DC 30 Vm, 3.0A (load R) 0.7A (cosø=0.4)	DC 5 V, 100 mA

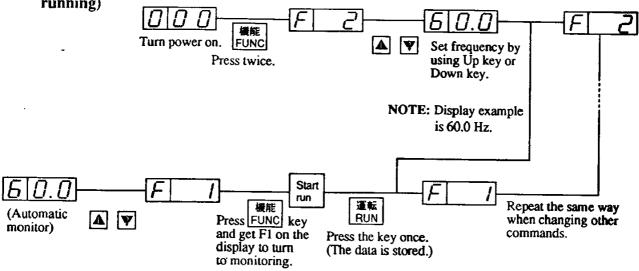
The alarm output terminals are connected as shown in Fig. (a) at the time of initialization. They can be changed as shown in Fig. (b) by setting $\boxed{C \mid 21}$.



8. OPERATION OF THE DIGITAL OPERATOR

8.1 Name of Keys



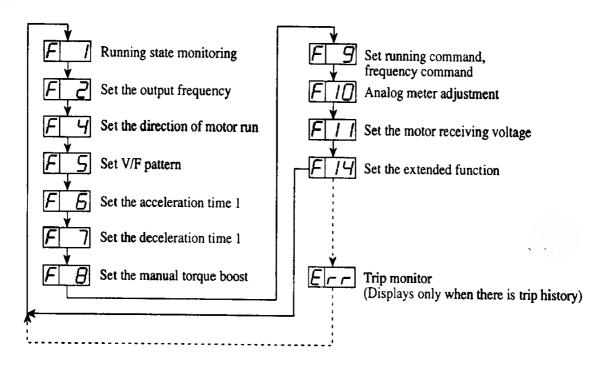


8.3 Key Description

概能 [Fun

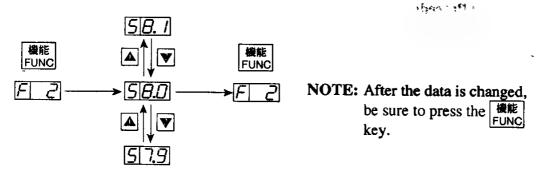
[Function key] . . . This key allows the selection of commands and memorizes parameters.

When each time the key is pressed, the display changes as follows.



[Up key, Down key] . . . These keys change the values of data, and parameters.

Pushing down this key once under | I to | I | Condition moves to the data state.



運転 RUN [RUN key] . . . This key starts the run.

The set value of F 4 determines a forward run or a reverse run.

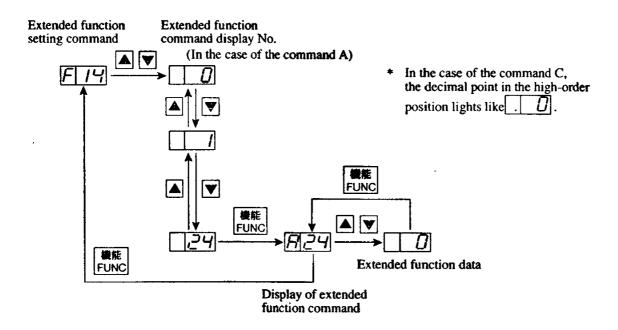
停止/リセット STOP/RESET

[STOP/RESET key] . . . This key stops the run.

When a trip occurs, this key becomes the reset key.

Screen transfer for extended commands

When an extended command is to be used, select the extended function command No. from $\boxed{F[I \ Y]}$ by using the keys $\boxed{\blacktriangle}$ and $\boxed{\blacktriangledown}$ so as to enter the extended function mode.



Explanation of screen display

- ① When the inverter is turned on, the display which is outputted when the power is turned off before it is turned on appears. However, when the data display section for the commands F4 to F14 is turned off, the command display (F4 to F14) at that time appears.
- ② At the time of second setting, the decimal point in the first position of the data display section is displayed like [22]. However, a display of more than 100 of the set frequency, acceleration and deceleration time, DC braking time adjustment time, or standby time after undervoltage does not mean the second setting.

8.4 Initialization List of Digital Operator

(1) Monitor mode, function mode

The initialized value and settable range of each mode are displayed.

For extended function setting of $\boxed{F[I\ Y]}$, the extended functions shown on pages 8-5 and 8-6 can be set.

				Scr	een display		Application
Display order	Function name	Туре	Command display	Settable during running	Range of set values	Initializa- tion	of 2nd setting function
1	Running state monitoring	Monitor- ing	FI	_	Frequency, current, DC voltage, rotational direction		—
2	Output frequency setting	Setting	F2	1	0.0 to 99.9 Hz/0 to 360 Hz	0.0	√
3	Running direction setting	Setting	F4	_	F/r (Forward/reverse)	F	_
4	V/f pattern setting	Setting	F5		0 to 57	NOTE 1	√
5	Acceleration time 1	Setting	F6	4	0.1 to 99.9 seconds, 100 to 999 seconds	NOTE 2	√
6	Deceleration time 1	Setting	F7	4	0.1 to 99.9 seconds, 100 to 999 seconds	NOTE 2	√
7	Manual torque boost setting	Setting	F8	√	0 to 99	11	√
8	Running command, frequency command setting	Setting	F9		0 to 3	03	
9	Analog meter adjustment	Setting	F10	1	1 to 99	72	
10	Motor receiving voltage setting	Setting	FII	_	200 to 240 V/380 to 460 V NOTE 3	NOTE 4	
11	Extended function setting	Setting	F14		0 to 85/ .0 to .21 NOTE 5	0	_

NOTE 1: 08 for 200 V class, 00 for 400 V class

NOTE 2: 10 seconds for 200 V class, 15 seconds for 400 V class

NOTE 3: For the 200 V class, one of 200, 220, 230, and 240 can be selected. For the 400 V class, one of 380, 400, 415, 440, 460, and 480 can be selected.

NOTE 4: 220 V for 200 V class, 380 V for 400 V class

NOTE 5: No extended function can be set during running. However, the set value of each function can be monitored.

(2) Extension function mode

- Each function name and settable range to the extension function mode are shown below.
- Set the extension function code to be changed by $\boxed{F/4}$.

Display			Screen display	Initial			Ref.
order	Extended function name	Code display	Setting range		Settable for 2nd function	Remarks	page
1	Control method	A 0	0-2	0	√		8-15
2	Motor capacity setting	Αi	0.2-5.5	NOTE 1	√		8-15
3	Motor poles setting	A 2	2/4/6/8	4	√		8-15
4	Maximum frequency adjustment	A 3	0 0-15 Hz	0.0	_		8-16
5	Start frequency adjustment	A 4	0.5-5.0 Hz	0.5	_		8-17
6	Upper frequency limiter setting	A 5	0-375 Hz	0			8-17
7	Lower frequency limiter setting	A 6	0-375 Hz	0			8-17
8	Jump frequency setting 1	A.7	0-375 Hz	0	_		8-18
9	Jump frequency setting 2	A 8	0-375 Hz	0			8-18
10	Jump frequency setting 3	A 9	0-375 Hz	0	_		8-18
11	Carrier frequency setting	A10	5/8/12/16 Hz	16			8-18
12	Frequency command sampling setting	A11	1-8	8			8-19
13	Multispeed first speed setting	A12	0-375 Hz	0	_		8-20
14	Multispeed second speed setting	A13	0-375 Hz	0			8-20
15	Multispeed third speed setting	A14	0-375 Hz	0			8-20
16	Multispeed forth speed setting	A 15	0-375 Hz	0	_		8-20
17	Multispeed fifth speed setting	A16	0-375 Hz	0	_		8-20
18	Multispeed sixth speed setting	A17	0-375 Hz	0	_		8-20
19	2-stage acceleration time setting	A18	0.1-999s	10.0	√	Changeable during RUN	8-21
20	2-stage deceleration time setting	A19	0.1-999s	10.0	√	Changeable during RUN	8-21
21	DC braking frequency setting	A20	0.5-375 Hz	0.5	-		8-21
22	DC braking force adjustment	A21	0-36 (400 V:0-20)	0			8-21
23	DC braking time adjustment	A22	0-600s	0	_		8-21
24	Electronic thermal level adjustment	A23	20-120%	100			8-22
25	Electronic thermial characteristic selection	A24	0/1	1			8-22
26	External frequency setting start	A26	0-375 Hz	0			8-19
27	External frequency setting end	A27	0-375 Hz	0			8-19
28	Acceleration selection (Linear, S-curve)	A28	0/1	0			8-23
29	Deceleration selection (Linear, S-curve)	A29	0/1	0	_		8-23
30	Overload previous notice signal settingl	A30	50-150%	150	_		8-23
31	Overload limit level setting	A31	50-150%	150	_		8-23
32	Oerload limit content selection	A32	0/1	0	_		8-24
33	LAD stop function setting	A33	0/1	0	_		8-24
34	Trip/retry function selection	A34	0/1	0			8-24
35	Trip ignorance selection	A35	O(off)/I(on)	0			8-24
36	AVR voltage setting for deceleration	A36	O/I	0	_	·	8-25
37	Motor voltage setting for deceleration	A37	200-270 V/380-540 V/000	220/380		000:Invalid during decel.	8-25
38	Dynamic braking usage ratio	A38	0.1-30.0, 31.0	5		31.0:BRD invalid	8-25
39	Optional arrival frequency for acceleration	A39	0-100%	100			8-26

Display	····		Screen display	Taribi at			Def
order	Extended function name	Code display	Setting range	Initial value	Settable for 2nd function	Remarks	Ref. page
40	Optional arrival frquency for deceleration	A 40	0-100%	100	_		8-26
41	Forward rotation	A41	0(off) /1(on)	1			8-26
42	Reverse rotation	A42	0 (off) / 1 (on)	1	_		8-26
43	Stop key ON/OFF selection	A43	0/1	0			8-27
44	Analog input selection	A48	0(5 V)/1 (10 V)	0	_		8-19
45	Frequency arival signal output method	A49	1/2	2			8-26
46	Analog/digital meter selection	A50	0/1	i			8-27
47	Frequency/current monitoring selection	A51	0/1	0			8-27
48	RUN signal output selection	A52	1/2	1	_		8-27
49	Enable/disable of frequency setting for software lock	A53	0/1	0	_		8-28
50	DC braking ON/OFF selection	A55	0 (off) / 1 (on)	0			8-22
51	DC braking edge/level selection	A56	0/1	1			8-22
52	Trip history clear selection	A57	0/1	0		•	8-28
53	Reduced voltage start selection	A58	0/1	1	_		8-28
54	Base frequency setting	A62	50-360 Hz	50	1		8-16
55	Maximum frequency setting	A63	50-360 Hz	50	1		8-16
56	Maximum frequency switching	A64	0 (120 Hz) / 1 (360 Hz)	0			8-16
57	Jump frequency range setting	A68	0-9.9 Hz	0.5	_		8-18
58	Multispeed seventh speed setting	A71	0-375 Hz	0	_		8-20
59	Frequency command adjust. (voltage)	A80	0-255	NOTE 2			8-29
60	Frequency command adjust.(current)	A81	0-255	NOTE 2			8-29
61	Allowable undervoltage time setting	A82	0.3-3.0s	1.0			8-29
62	Undervoltage retry waiting time	A83	0.3-100,0s	10.0			8-29
63	Software lock selection	A84	0/1	0	_		8-30
64	Deceleration rate setting for overload limit	A85	0.1-31.0s	1.0		31.0:Invalid	8-23
65	Input terminal setting 1	CO	0-12	1			8-31
66	Input terminal setting 2	C1	0-12	2			8-31
67	Input terminal setting 3	C2	0-12	7			8-31
68	Input terminal setting 4	C3	0-12	11			8-31
69	Input terminal setting 5	C4	0-12	0			8-31
70	Output terminal setting	C10	0-2	0			8-32
71	Input terminal a and b contact setting	C20	00-1F	00			8-33
72	Output terminal a and b contact setting	C21	00-03	03			8-34

NOTE 1: The most applicable motor capacity of the inverter is set.

NOTE 2: The initial setting of each inverter is adjusted when shipping from the works.

8.5 Explanation of the Mode

(1) Monitor mode and Function mode

Command	Contents and display	Remarks				
F	This command monitors the run state Frequency, output current, DC voltage and direction of revolution are displayed sequentially. [During run]					
Running state monitoring	Frequency, output current, DC voltage and direction of revolution are displayed	Possible to change during run				
	automatic monitoring (Any display is available.) Pressed (Motor rotation direction) Pressed 4 times (Operation frequency)					
	000					

Command	Contents and display	Remarks
Output frequency setting	This command sets the output frequency. Set frequency from 0 to 99.9 Hz by 0.1 Hz Set frequency from 100 to 360 Hz by 1 Hz (NOTE 1) Set frequency from 100 to 360 Hz by 1 Hz (NOTE 1)	Possible to set during run
	To push down or once changes one digit. Keeping pushing down changes continuously. The output frequency in the multispeed mode can be set as specified below. (1) Connect the multispeed terminal for setting the frequency to PV24. (The relationship between multispeeds 1 to 7 and the control circuit terminals as shown below.)	
	SW3 SW2 SW1 Multispeed 1 ON OFF Multispeed 2 OFF ON OFF Multispeed 3 ON ON Multispeed 4 ON OFF Multispeed 4 ON OFF Multispeed 5 OFF ON Multispeed 6 ON ON Multispeed 7 OFF OFF	
	The above example is the case when the intelligent input terminals 1, 2, and 3 are set to the terminals CF1, CF2, and CF3 respectively. (Set using	
	(4) Press the key once. (Check whether the output frequency, which is set is displayed.) (5) By repeating (1) to (4), the output frequency in the multispeed mode can be set NOTE 1: When setting to over 120 Hz, the changing over maximum frequency is necessary. NOTE 2: Whenever any data is changed, be sure to press the FUNC key before starting the next setting. Note that when the HUNC key is not pressed, the data will not be set. (*) The multi-speed output frequency can be set by the above method independently	
	of the setting status of the command F 9. (*) The setting frequency blinks during stop, and does not blink during running. This distinguishes two conditions, RUN and STOP.	600 Brinking during stop

Command	Contents and display				
FY	Set the motor direction. Set the motor direction when running by pressing 温板 key.	Im- possible to change during run			
Running direction setting	Forward run Switching can be done by pressing				
	Reverse run				

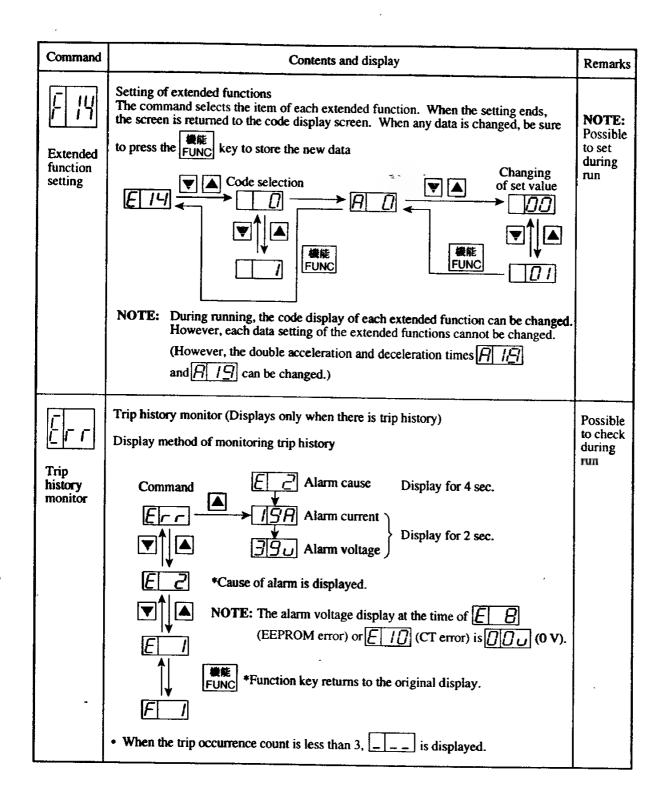
.

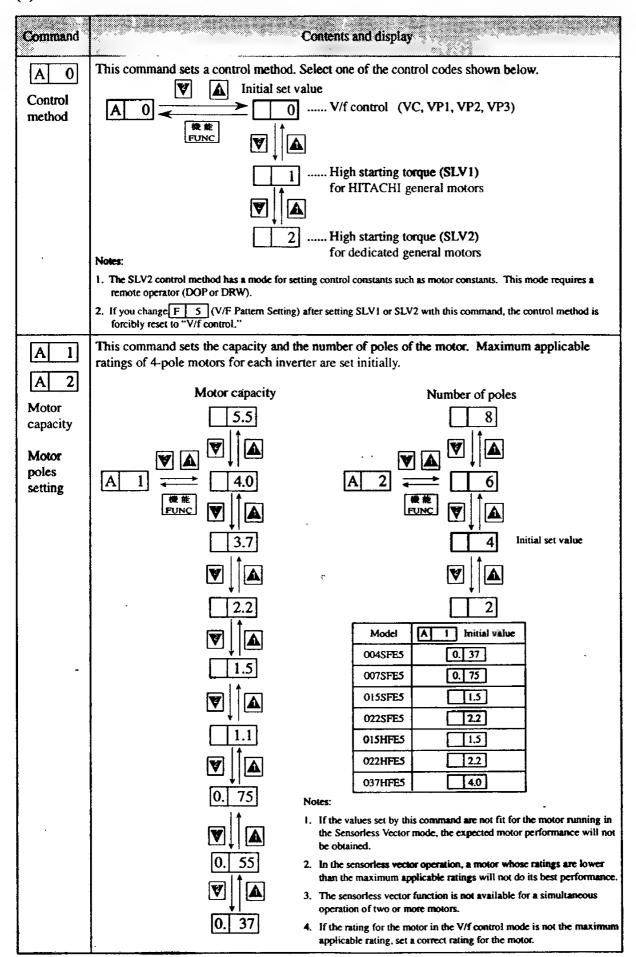
Command	Contents and display					
V/f pattern	This command sets V/F pattern. When combining V/F patterns other than the following using the control method (A0), the basic frequency (A62) and the maximum frequency (A63) of the extention function mode, the display shows	Im- possible to set during run				
setting	Output voltage V/F pattern 200 220 230 240 380 400 440 460 Output voltage V/F pattern 200 220 230 240 380 400 440 460					
	00 08 16 24 Constant torque 04 12 20 28 V/F VP1 Reducing torque 1.5 power					
	01 09 17 25 100 % 05 13 21 29 100 Hz					
	02 10 18 26 0 60 Hz 06 14 22 30 100 % 0 60 Hz					
-	03 11 19 27 0 60 120 Hz 07 15 23 31 00 0 60 120 Hz					

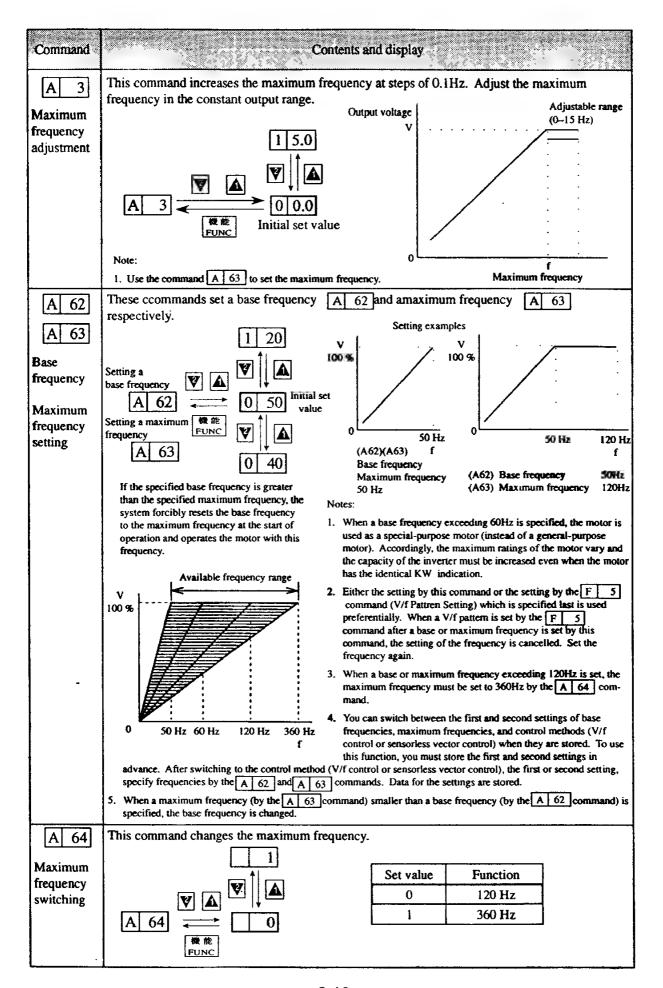
Command	Contents and display						Remarks	
	Special V/F pattern							
	Output voltage				N.C.]		
	200	220	230	240	V/F pattern			
	380	400	440	460		Uses for V/F pattern		
,	50	51	52	53	VF VC % 1000 Hz	Constant torque chracteristics: Conveyor Reduced torque characteristics: Fan, pump		
	54	55	56	57	VF VC 100 % 120 Hz	ne fra E no		
	ľ	NOT)	aı	nd thi	sensorless vector control s command is changed in eful in this regard.	(SLV1, SLV2) is selected as a control system n design, V/F control is forcibly selected.		

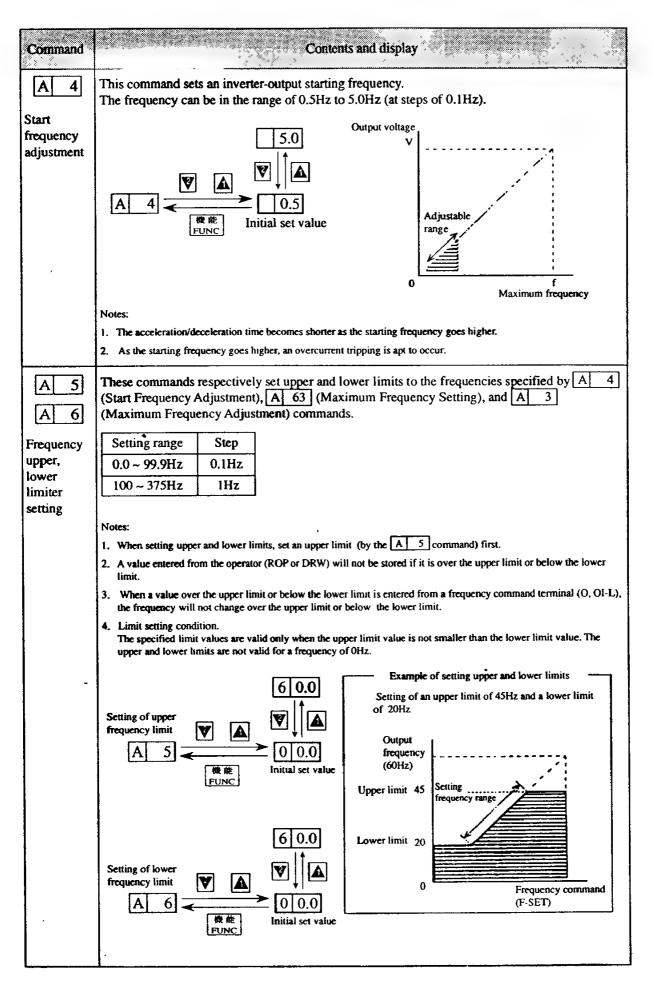
Command	Contents and display				
Acceleration time 1 Deceleration time 1	These commands set and display Acc. time (F 5) and Dec. time (F 7). In the case of adjustment in real time, press the FUNC key after data is changed. Setting range Period 0.1 to 99.9 Every 0.1s 100 to 999 Every 1s • When a time of more than 999 seconds is set by the remote operator, is displayed on the digital operator.	Possible to set during run			
Manual torque bost setting	Set torque boost • Motor torque can be adjusted to increase the output voltage when the starting torque is not sufficient in V/F control. Pay attention not to cause the motor to burnout and an inverter trip. • Setting is effective only when V/F control is selected. • In the case of adjustment in real time, press the RUNC key after data is changed. Code Output voltage 100% Setting and changing is done with weys.				
Running command Frequency command setting	Change setting mode Run command to Frequency command to (NOTE 1) Digital operator Digital operator Digital operator Terminal block Terminal block Digital operator Terminal block Terminal block NOTE 1: The multi-speed output frequency can be set for one of	Im- possible to set during run			

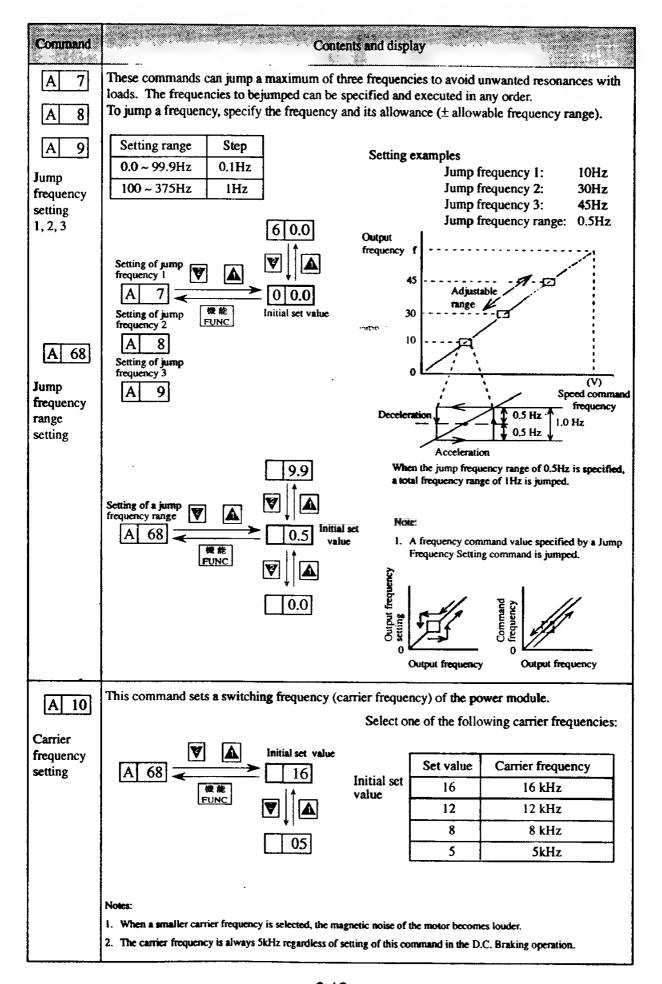
Command	Contents and display	Remarks
Analog meter adjustment	The voltage which is outputted to the [FM] monitor terminal can be adjusted. When the equipment starts running, t/T which is proportional to the output data is outputted between the terminals [FM] and [CM1]. Adjust the meter so that it indicates the highest point when the output is maximized.	Possible to set during run
	Maximum level of analog meter	
	Frequency monitor: Maximum frequency Current monitor: 200% of rated current of inverter	
	NOTE: This function is valid only when the analog monitor is used. (Analog frequency monitor, current monitor)	
Motor receiving voltage setting	The command sets the supply voltage for the motor. Set the supply voltage for the motor as shown below. 200 V class 200 230 240 Initialized value	Im- possible to set during run
	400 V class 3/80 4/00 4/15 4/40 4/80 4/80 Initialized value	

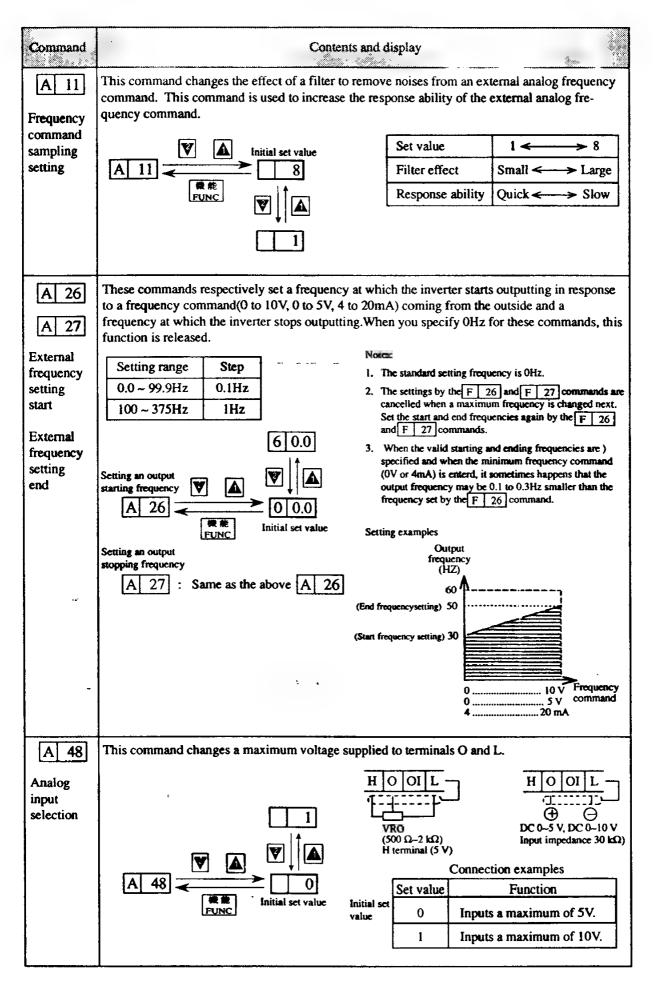


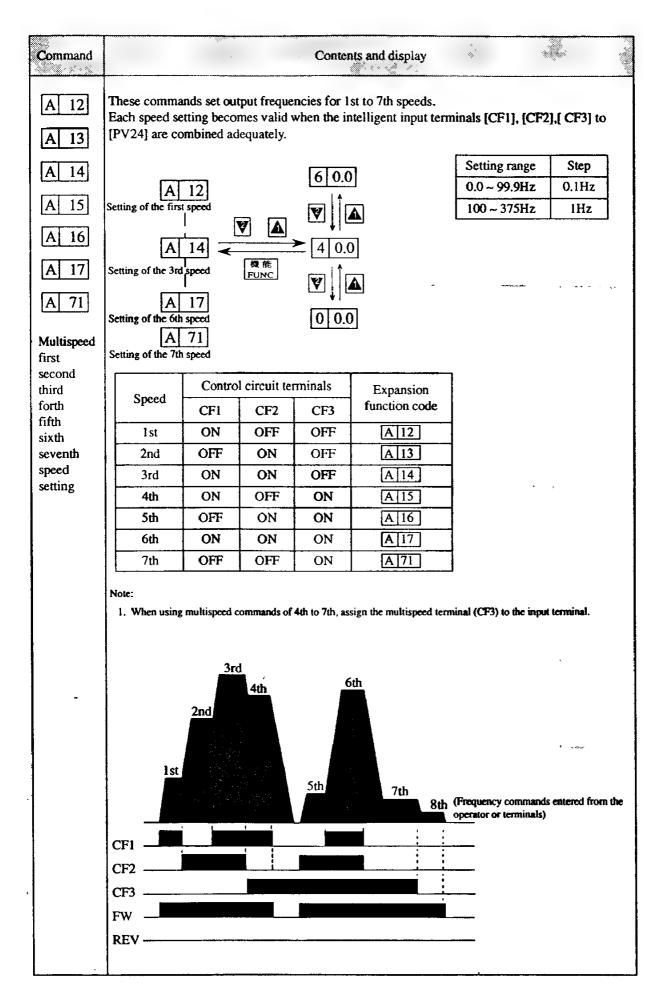


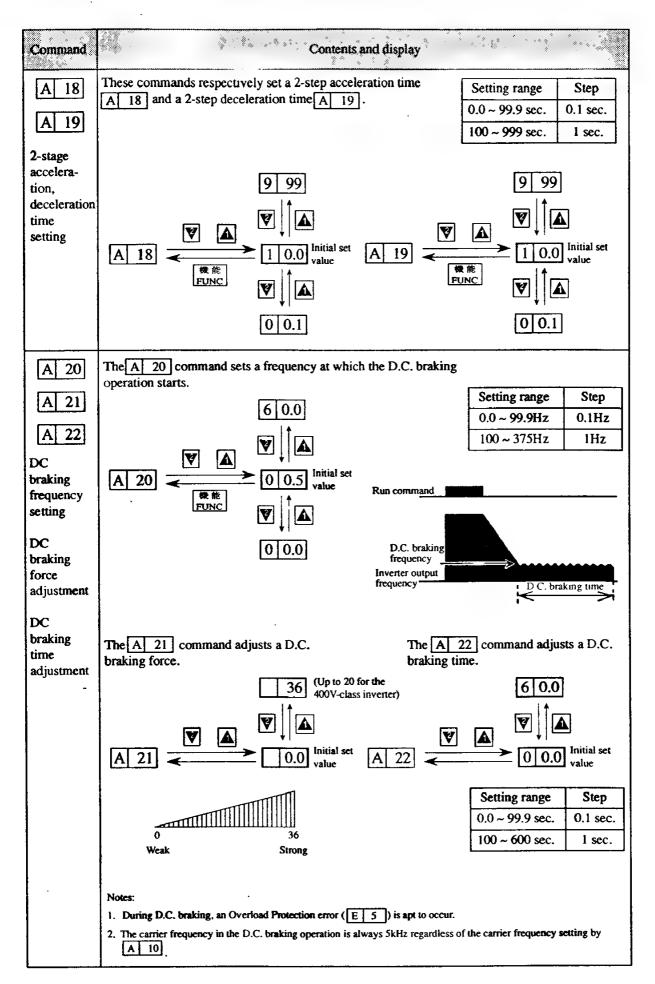


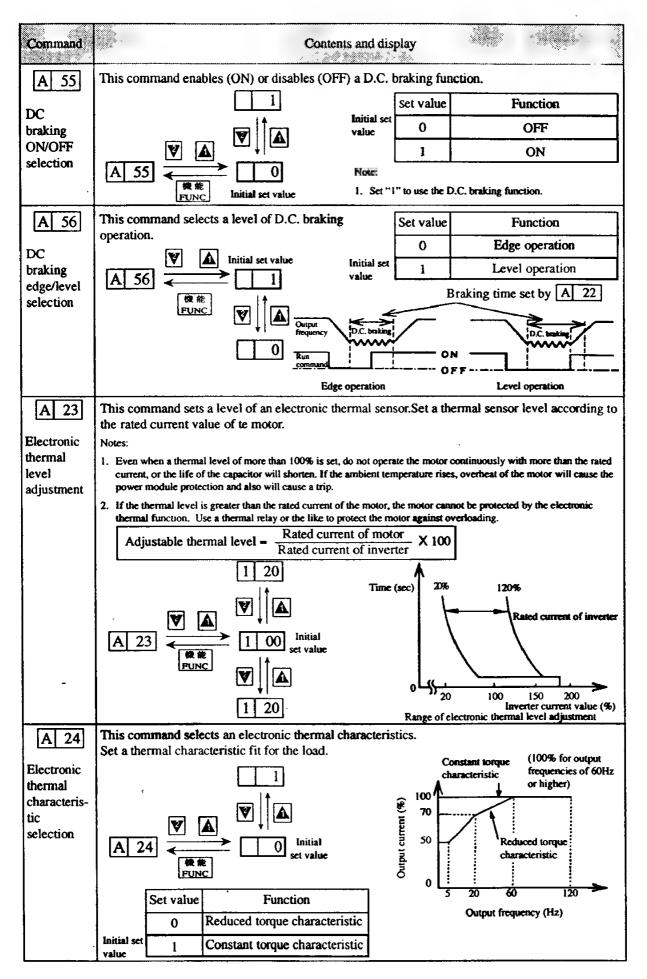


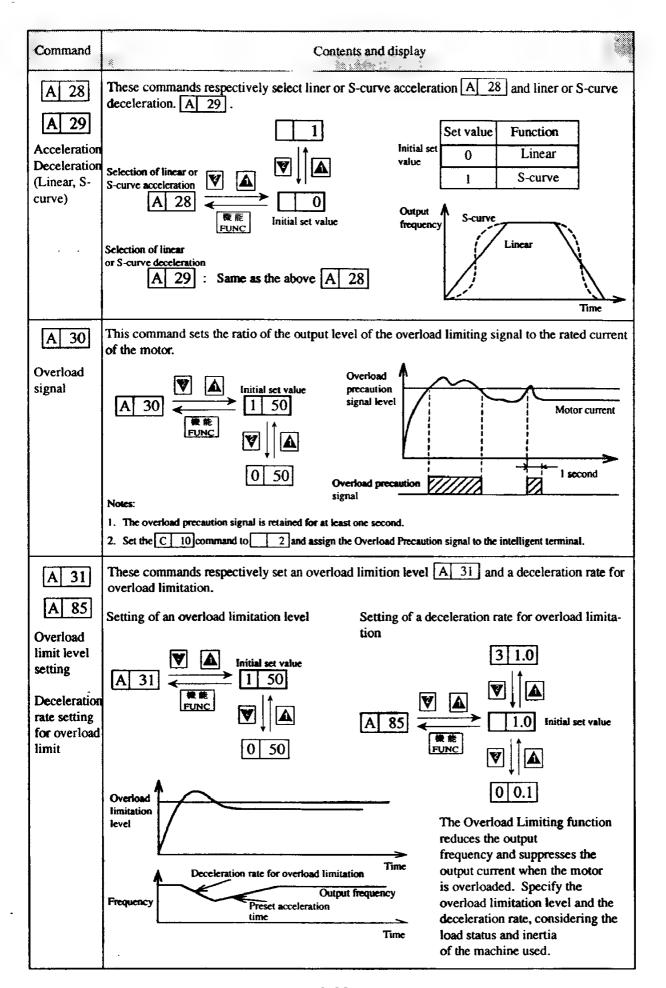


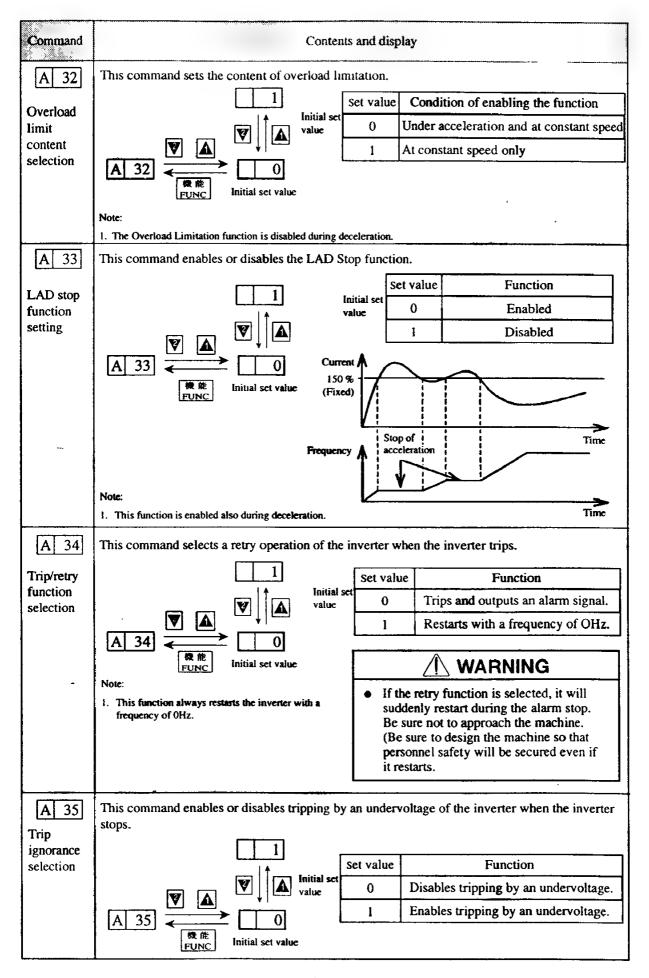


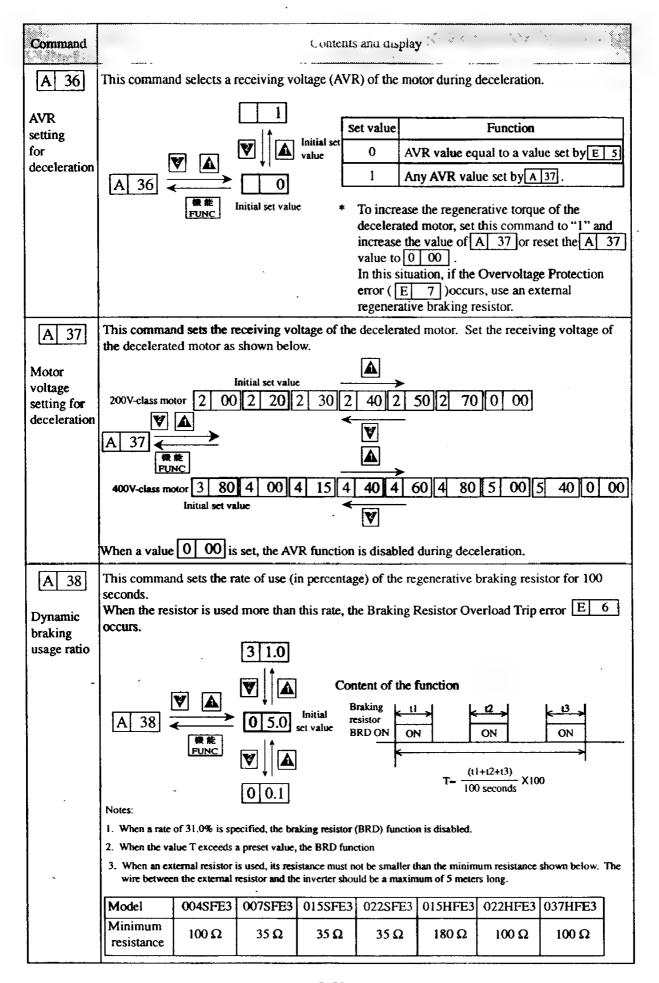


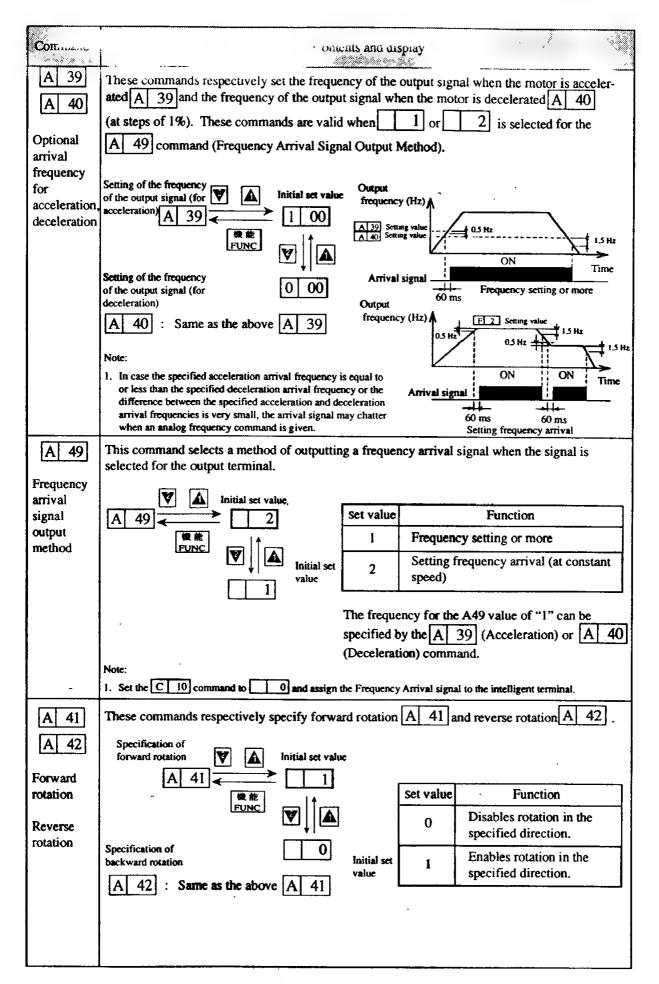


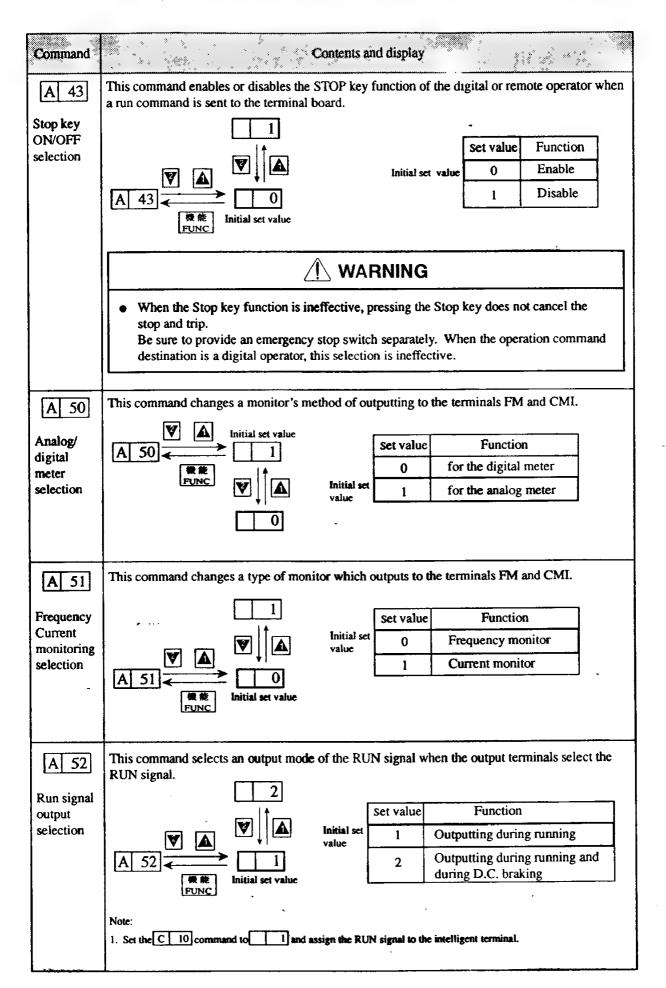


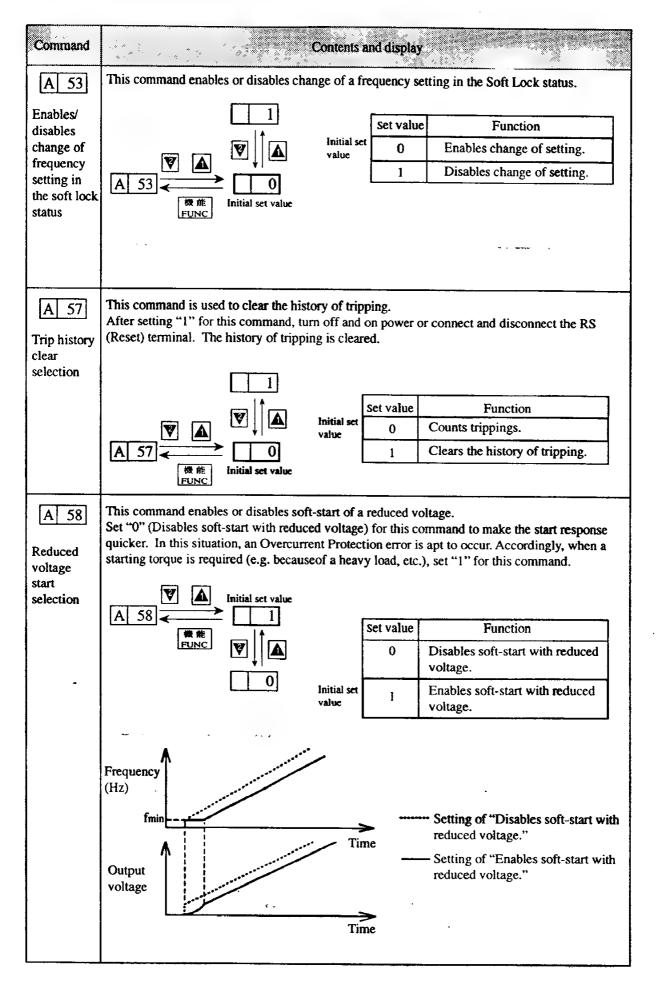


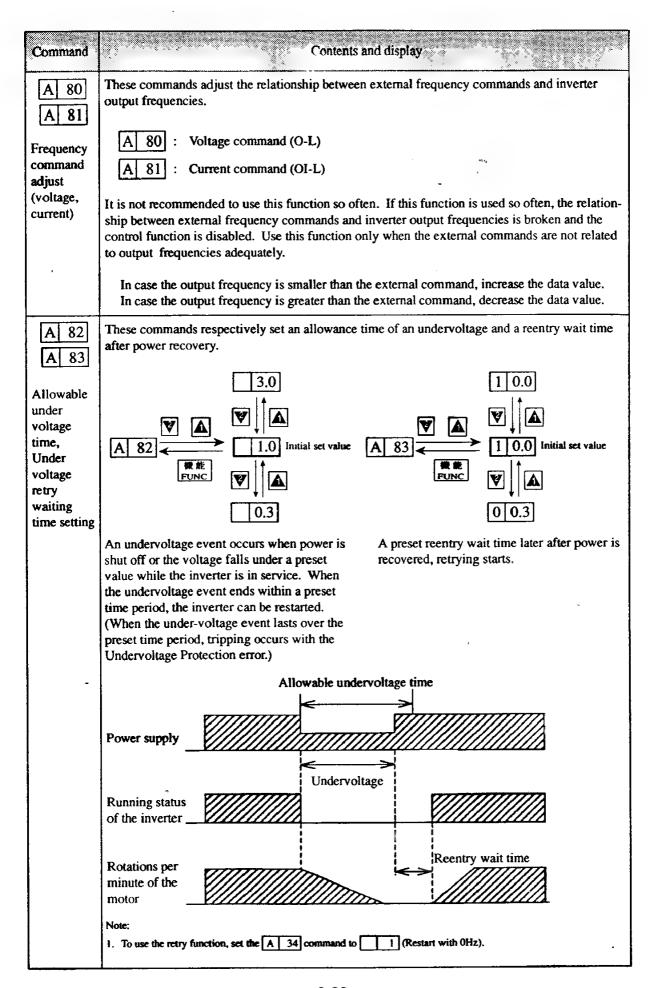


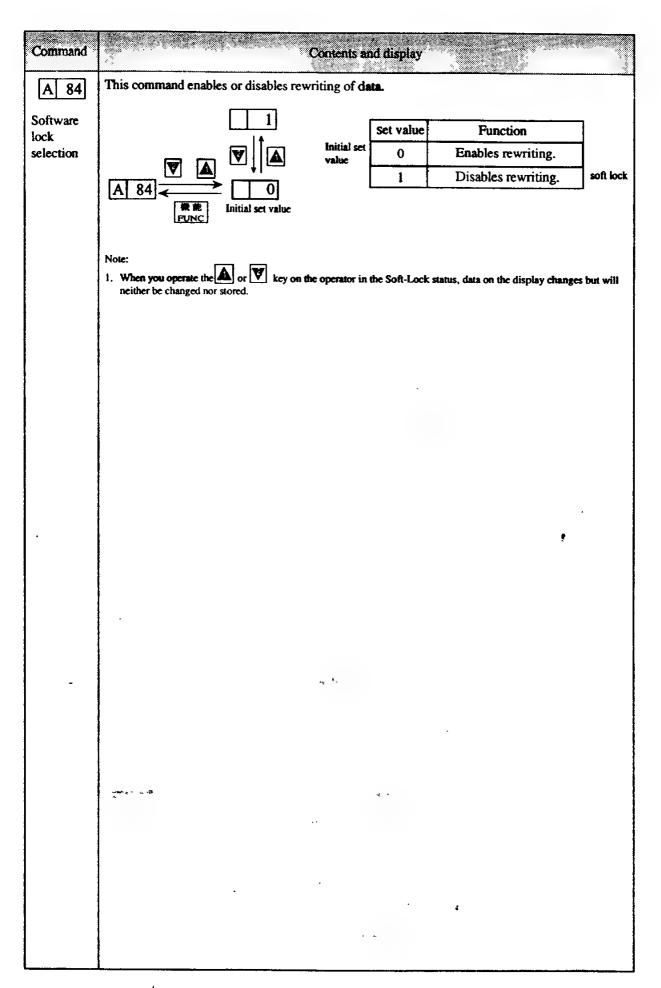






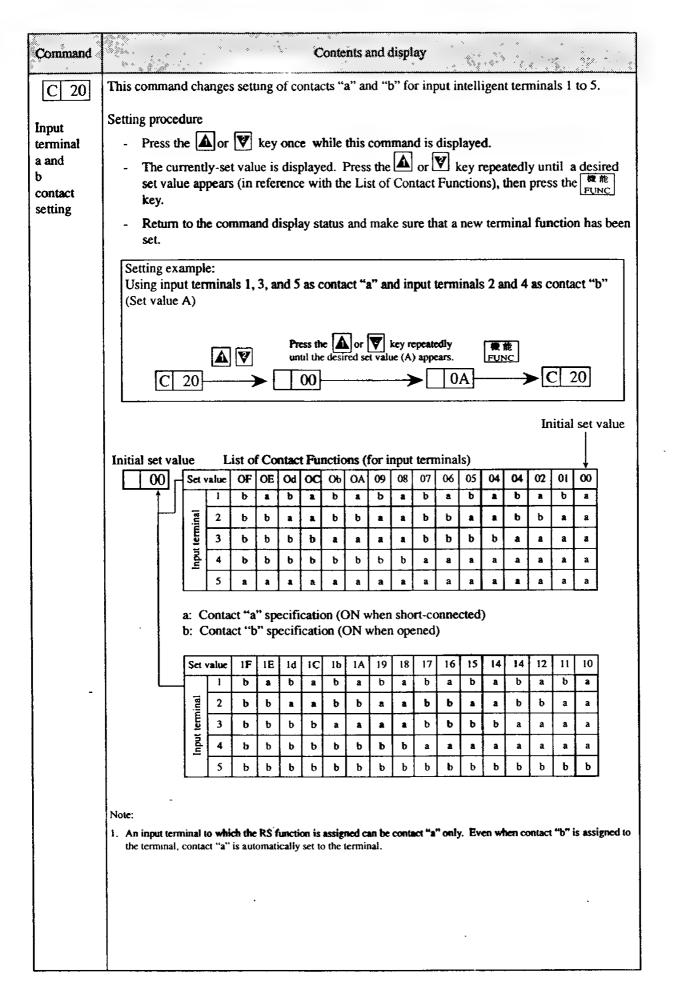


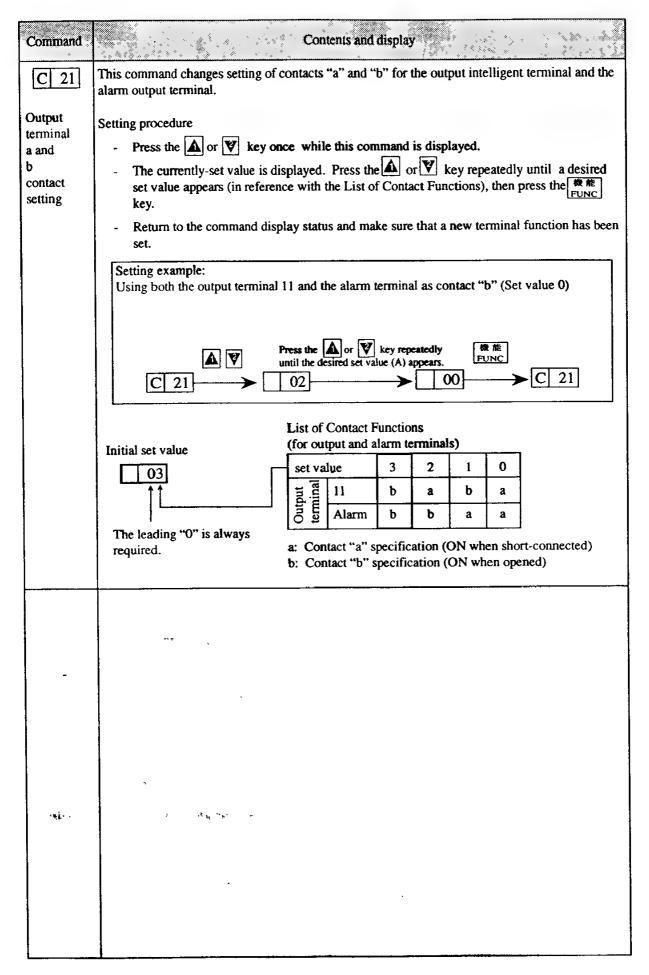




Command		*	Cont	ents and dis	play					
	These com terminals).		ly assign termin	al functions	to terminals 1 to 5 (a total of five					
\ \					ninals or changing the order of the					
C 4			-		ninals by these commands. It should be 12 msec or more.					
		nent of command	-	•	a should be 12 misec of more.					
Input	Command	Name of function	Terminal symbol	,	1					
terminal		nput terminal setting	1	1	Input intelligent Input intelligent					
setting 1,2,3 4 and 5	CII	nput terminal setting	2 2	2	terminals terminals					
4 and 5	C 2	nput terminal setting	3 3	7	3 2 1 PV24 FW 5 4 CMI CMI AL0					
	 	nput terminal setting	+	11	H O OI L FM CM2 II AL2 AL1					
	 -	input terminal setting	<u> </u>	0						
	Setting pro		<u> </u>	<u> </u>	1					
			key once for a d	esired term	inal setting command.					
	- The	preset value of th	e terminal is dis	played. Pre	ess the 🛕 or 🔻 key repeatedly until the					
	desi	red value appears			with the List of Functions), then press					
	the	機能 FUNC								
		- Return to the command display status and make sure that a new terminal function has been assigned.								
	Assigning the SFT (Terminal Soft Lock) function to the RS (Reset) terminal Enter the value of a desired terminal by pressing the or weight key. C 0 11 12 C 0 List of Terminal Functions Set value Symbol Name of function									
	0	REV I	ackward rotatio	n						
	1		peed 1							
	2		peed 2	~						
	3		peed 3							
-	4		xternal D.C. bra	king						
1	5		nitial setting							
	6		econdary setting							
	7	2CH 2	-step acceleration	on/decelerat	ion					
	8	FRS I	ree-running stop	p						
	9	EXT I	xternal tripping							
	10	USP U	JSP function							
	11	RS I	Resetting							
	12	SFT	erminal Soft Lo	ck						
		terminal setting		ت ک						
		not enter identica			4 commands. al to another terminal, first assign a set					
]					hich its function is moved, then assign the					
	val	ue of a function to	be moved to th	e destinatio	n terminal. (Do not enter a value of the					
	fun	ction to the destir	ation terminal fi	irst.)						

Command			Contents and d	lisplay					
C 10	This command assign mand when changing				nt terminal 11. Use this com- ial.				
Output terminal setting	Assignment of comm	ands to intellig	ent terminals		_				
Setting	Command Name	of function	Terminal symbol	Initial value					
	C10 Output t	erminal setting	11	0]				
		3 H	2 1 PV24 FW O OI L FM	CM2 11	CMI ALO AL2 AL1 put intelligent terminal				
	- The preset value a the 操能 key.	e of the termin ppears on the c	lisplay (in referer	Press the Ance with the	g command. or we key repeatedly until the List of Functions), then press new terminal function has been				
	Setting example: Changing the RUN (Run signal) function to the AR (Frequency Arrival signal) functiony Enter the value of a desired terminal by pressing the or very key.								
	C 10 by pressing the A or V key. Func								
	List of Output Terminal Functions								
	Set value Symbol	Name of fu	nction .	,					
-	0 AR	<u> </u>	Arrival signal						
	1 RUN Running signal								
	2 OL Overload Precaution signal								
	-								
			•						





9. PROTECTIVE FUNCTIONS

The J100 series inverters are equipped with protective functions against overcurrent, overvoltage, and undervoltage which protect the inverter. If the protective functions are engaged, the output is shut down, motor runs free and holds that condition until it is reset.

Description	Contents		Display			
Power module protection (NOTE 1) When output of an inverter is short circuited or the motor is locked, a large current flows through the inverter and causes a fault. When the current flowing through the power module or a temperature chapter of the main devices comes to certain level, the cutruit decimal content of the main devices comes to certain level, the cutruit decimal content of the main devices comes to certain level, the cutruit decimal content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked, a large current flowing through the power module or a temperature content of the motor is locked.						
(NOTE 1)	1371 Alexander of the state of the second state of the second state of the second second state of the seco					
	is cut off.	Acc.	E 3			
		Stop	E 4			
Overload protection (NOTE 1)	When a motor overload is detected by the electronic thermal function, to output of the inverter is cut off.	he	E 5			
Braking resistor overload	When regenerative braking resistor exceeds the usage time ratio an over caused by the stop of the BRD function is detected, and output of the in is cut off.	voltage verter	E 6			
Overvoltage protection	When the converter voltage exceeds a certain level due to regenerative e the motor, this protection function engages, and the output of inverter is	energy from cut off.	<i>E</i> 7			
EEPROM error (NOTE 2)	When the memory built in has problems due to noise or excessive temp this protective function engages, and the output of inverter is cut off.	erature rise,	E 8			
Undervoltage protection	A decrease of the input voltage of an inverter results in improper function of the control circuit. It also generates motor heat and causes low torque. Output is cut off when the input voltage goes down to less than 150 V to 160 V (200 V class), 300 V to 320 V (400 V class).					
СТ ептог	When a large noize source is near the inverter or an abnormality occurs on built-in CT, the output of the inverter is cut off.					
CPU error	Malfunction or abnormality on built-in CPU and the output of the inverter is cut off.					
External trip	An abnormality signal from external equipment cuts off the output of the inverter.					
USP error	It indicates an error when power is turned on while the inverter is being (When USP function is selected)	run.	E 13			
Ground fault protection	The inverter is protected by detection of ground faults between the inverted and the motor upon power on. There may be the possibility of power may be the power may be	rter output odule failure.	E 14			

NOTE 1: If a trip occurs, press the reset key after an elapse of 10 seconds to restore the inverter.

NOTE 2: If an EEPROM error occurs, be sure to confirm the setting value again.

Other display

Contents	Display
It is displayed when the registered data in F3 is different from the respective data. (For example, it is displayed when confirming V/F data in F5 after \(\begin{aligned} \overline{\mathcal{D}} \overline{\mathcal{B}} \) was selected in F3)	
It is displayed when the fault happens between digital operator and the inverter, or short circuit RS-PV24 for four seconds or more. Pushing down any one of the A value and FUNC keys recovers. If not, turn off and on power again.	
It is displayed when power is shut off.	EE
It displays the rest time of retry waiting time after the power recovery of undervoltage when selecting the retry mode. (example) - / [] shows restart after 10 seconds.	-V O

For display contents when the remote operator or copy unit is used, see page 13-1 and the subsequent pages.

10. TROUBLESHOOTING

Sy	mptom	Probable cause	Countermeasure
The motor will not run.	The inverter outputs U, V and W are not supplying voltage.	• Is power being supplied to terminals L1, L2(N), and L3? If it is, the POWER lamp should be on.	 Check terminals L1, L2(N), and L3, U, V, and W. Turn on the power supply.
	ing voltage.	• Is the display E ?	• Press and check the content. Then press the reset key.
		Is the operation instruction RUN ON? Is terminal FW (or RV) connected to terminal PV24? .	Set to ON. Connect terminal PV24 to terminal FW (or RV) on the printed-circuit board. (When the terminal mode is selected.)
		• Has the frequency setter been turned on by pushing 機能 FUNC key to select F 2 and then ▲ ▼ key. • Are the printed-circuit board terminals H, O and L connected to the potentiometer?.	 Push down keys and set. When terminal mode is selected, connect the potentiometer to H, O, and L, and then set.
		• Has RS/FRS been left ON?	• Release reset.
		• Is the mode key F 5 setting correct?	• Read the instruction manual again (8-10).
	Inverter outputs U, V, and W are supplying voltage.	Has the motor seized or is the load too great?	Release seizure or lighten the load. Test the motor independently.
	The optional remote operator is used. (copy unit)	Are the operational settings between the remote operator and inverter unit correct? .	• Check the operation of the optional remote operator. (copy unit) ON OFF 1: OFF 2 ON (Same as J300)
The direction of the motor is reversed.		 Are the connections of output terminals U, V, and W correct? Is the phase sequence of the motor forward or reverse in respect to U, V, and W? 	• Make the connections according to the phase sequence of the motor. (In general, forward should be in the sequence: U, V, and W.)
		• Are the terminals on the printed-circuit board correct? . • Is the mode key	Terminal FW for forward, and RV for reverse.

Symp	tom	Probable cause	Countermeasure
The rpm of the motor will not		After checking the wiring of the frequency setter, the rpm still does not increase when the setter is turned.	Replace the frequency setter.
increase.		Are terminals 1 and PV24, terminal 2 and PV24, terminal 3 and PV24 ON?	• Turn off terminal 1, 2, and 3. (When the frequency and multistage speed are fixed at a given frequency, the speed potentiometer will be invalid.)
		Is the load too great?	 Decrease the load. When the load is too great, the limiting function will be activated, so that the rotational speed will be lower than the setting.
Rotation is unstable.		 Is the fluctuation in load too great? Is the power supply voltage fluctuating? Is some peculiar frequency causing the problem? 	 Increase the capacity. (Both of the motor and inverter.) Decrease the fluctuation. Change the output frequency slightly.
The rpm of the motor does not match the inverter.		 Is the maximum frequency setting correct? Are the number of motor poles, the gear ratio, and pulley ratio correct? 	 Check the V/F pattern against the motor specifications. Check the speed-change ratio.
	The data has not changed.	• Was the power turned off without pushing the 根能 key after the data was changed with ▲ ▼ keys.	• Input the data and push the FUNC key once.
		• The data is memorized upon power off. Is the time from power OFF to ON less than six seconds?	Take six seconds or more when turning power OFF and ON after changing the data.
b u	Data copied by the copy init s not input.	Is the power turned off for six seconds or more after the display changed from REMT to INV.	Copy again and turn the power off six seconds or more after copying.

Syn	nptom	Probable cause	Countermeasure
The data is not changed.	Frequency setting can not be changed. Run and stop can not be done.	The change of the terminal mode and digital operator mode were correct?	• Confirm the change in F 9 setting mode. (See page 8-12.)
	The data can not be changed.	Is software lock ON? Is software lock ON with software lock selection [F][BY] (date: 1) Is the switch 4 mounted on the back of the remote operater (copy unit) ON? (See page 13-2)	Open SFT terminal and PV24. Change the data of [1] [1] to 1 to 0. Turn the switch OFF.
		Note: If software lock is ON because of use with an explosion proof motor, do not release the software locks.	

Precautions for data setting

When changing any set data by one of the following methods (① to ③), keep the equipment unoperated for 6 seconds or more after the selected method is executed. When any key is pressed, or the reset operation is performed, or the power is turned off within 6 seconds, correct data may not be set.

- Changing the data and pressing the STR key to store the data
- Operating the COPY key when copying another inverter data using the copy unit (DRW) (See page 13-12.)
- 3 Returning to the initialization (the factory settings) (See page 7-7.)

11. MAINTENANCE AND INSPECTION

11.1 Maintenance and Inspection Precautions

WARNING

- After a lapse of more than 5 minutes after turning off the input power supply, perform the maintenance and inspection.
 - Otherwise, there is a danger of electric shock.
- Make sure that only qualified persons will perform maintenance, inspection and part replacement. (Before starting the work, remove metallic objects from your person (wristwatch, bracelet, etc.)
 - (Be sure to use tools protected with insulation.)
 - Otherwise, there is a danger of electric shock and/or injury.

CAUTION

 When removing connectors, never pull the wires. (Wires for cooling fan and thermal relay)

Otherwise, there is a danger of fire due to wire breakage and/or injury.

General precautions

Always keep the unit clean so that dust or other foreign matter does not enter the inverter. Take special care in regard to breaking lines and connection mistakes. Firmly connect terminals and connectors. Keep electronic equipment away from moisture and oil. Dust, steel filings and other foreign matter can damage insulation, causing unexpected accidents, so take special care.

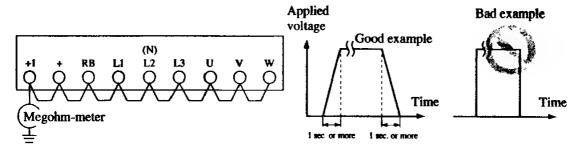
11.2 Inspection Items

- (1) Daily inspection
- (2) Periodic inspection (Approximately once a year)
- (3) Insulation resistance tests, withstand voltage tests

Conduct these tests by short-circuiting the terminals as shown below, and by following the conditions described.

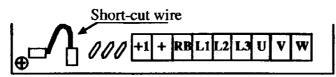
- In regard to insulation resistance tests, measure the terminals below and the grounding at 500 VDC, and make sure that 5 M-ohms or greater is indicated.
- Do not perform the withstand voltage test. When it should be done, in regard to withstand voltage tests, supply the terminals below and the grounding with 1500 VAC (200 V class), 2000 VAC (400 V class) for one minute, and make sure that there are no abnormalities.
- Do not conduct insulation resistance tests and withstand voltage tests for terminals other than those indicated below.

Increase or decrease the applied voltage for the withstand voltage test slowly and turn the equipment 0 V again.



Insulation Resistance Tests and Withstand Voltage Tests

• Remove short-cut wire on the power PCB before conducting the test. And be sure to attach short-cut wire after the test. (for 400V class only)



- NOTE 1: If the inverter is used under high temperature and heavy load conditions, its operating life will be significantly reduced.
- NOTE 2: If the inverter has been stored for three years or more, apply the following conditions.

Apply 80% of the rated voltage of the capacitor for 1 hour at normal temperature.

7.8

- A Increase the voltage to 90% and apply it for 1 hour.
- B Apply the rated voltage for 5 hours.
- NOTE 3: Precautions in handling printed-circuit boards.

When maintenance and inspection of printed-circuit boards is necessary, be sure to follow the precautions below.

Prevent damage caused by static electricity. The MCUs and ICs on a printed-circuit board can be destroyed by static electricity, so be sure to ground work benches, soldering irons, and yourself before working on a printed-circuit board.

11-2

We recommend that the following parts be stocked to reduce down time.

Recommended Spare Parts

Part description	Symbol	Qua	ntity	- Remarks
Tan description	Symoon	Used	Spare	Remarks
Main circuit P.C. board assembly	POWER PCB	1	1	Main circuit device, circuit parts, fin assembly
Cooling fan	FAN	1	1	Used for 015SFE5 and 022SFE5 015HFE5 to 037HFE5
Smoothing capacitor P.C. board assembly	СВ РСВ	1	1	Used for 015SFE5 to 022SFE5 015HFE5 to 037HFE5 Store this part at a temperature ranging from -20°C to 30°C
Digital operator	D. OPE	1	1	Applicable for all models
Logic P.C. board	LOGIC PCB	1	1	Same as above (Input kw data)

Daily Inspection and Periodic Inspection (1/3)

Inspection	Instruction item	Tresoction contant	Inspec	Inspection cycle	Increasion method	o iso	Standard	
location	man nonadem	manon nonadem	Daily	Periodic	normali ilicanodelli	Cilicina	replacement period	
Overail	Ambient environment	Check ambient temperature, humidity, dust, corrosive gases, oil mist, etc.	7			Ambient temperature between -10 to +40°C; no icing.		Thermometer
		~	· · · · · · · · · · · · · · · · · · ·			Ambient humidity 20 to 90%; no dew condensation.		
	Devices overall	Check for abnormal vibrations and noise.	7		Visual and aural inspection.			Hygrometer
	Power supply voltage	Check the input line voltage.	7		Measure the voltage between inverter terminals R, S, and T.	No abnormalities. 220 to 240 V, 50/60 Hz 380 to 415 V, 50 Hz 400 to 460 V, 60 Hz		Tester
Main circuit	Overall	(1) Insulation resistance test (between main circuit terminals and grounding terminal)		7		No abnormalities in (1) and (2). Tightening torque	1	500 V class Megohm meter
		(2) Check installation for looseness.		7	(1) Tighten.	(except for terminal block) • M3 (Diode module): 0.59 - 0.79 N•m	4	
		(3) Check for evidence of overheating in the various components.		7	(2) Visual inspection.	• M4 (Power module): 0.98 - 1.47 N•m • M3: 0.79 - 0.98 N•m • M4: 0.98 - 1.18 N•m	s bouge a	
		(4) Clean.		7				
William I								

Daily Inspection and Periodic Inspection (2/3)

Tastmiments			Capacity meter			Tester	1			
Standard	period		5 years	(INOTE)	1		2 - 3 years			
Criteria	# F F F F F F F F F F F F F F F F F F F	No abnormalities.	Visual inspection of No abnormalities in (1) and	(7).	(1) No abnormalities.	(1) Visual inspection. (1) No abnormalities.	(1) Smooth rotation		(2) No abnormality	
Increation method		Visual inspection	Visual inspection of	(1) and (2).	(1) Aural inspection.	(1) Visual inspection	(1) Rotate manually with power off.	(2) Increase tightening		
Inspection cycle	Periodic	7		:	7	7				
Inspe	Daily		7	7			7		7	
Incredition	Tipolico ilongodent	No damage.	(1) Check for leaking	(2) Check for swelling	(1) Check for stuttering noise when operating	(1) Check for large cracks or changes in color	(1) Check for abnormal vibrations and noise		(2) Check for dust	
Total acitomore	man manadem	Terminal block	Smoothing	capacitor	Relays	Resistors	Cooling fan	,		
Inspection	location	Main								

Daily Inspection and Periodic Inspection (3/3)

Inspection	Inspection item	on item	Inspection content	Inspec	Inspection cycle	Inspection method	Criteria	Standard	Instruments
location	maadsuu			Daily	Periodic	mspection method	Cilieria	replacement period	Instruments
Control	Operation check	chec k	(1) Check the balance of the output voltage of individual phases when operating the inverter independently.		7	(1) Measure the voltage between the phases of inverter output terminals U, V, and W.	(1) Within 2% voltage difference between phases.		
			(2) Conduct a sequence protection operation test, and make sure that there are no errors in the protection and display circuits.		7	(2) Simulate operation of the inverter protection circuit.	(2) Operate without any abnormalities.		
_	Compo- nent	Overall	(1) No abnormal odor or changes in color.		7	Visual inspection	No abnormalities		
	including printed- circuit		(2) No significant corrosion.		7				
	boards	Capacitor	No fluid leaka ge or deformation.	7		Visual inspection		5 years (NOTE)	1
Display	Digital operation	eratio n	(1) No illegible display	7		Visual inspection	Normal operation	7 years	
	panici	-	(2) No lack of character	7			Display can be read out.		
			(3) No blown out LEDs	7					

1. The life of capacitor will be affected by the amibient temperature. See Appendix 3 Capacitor Life Curve. NOTE:

2. The inverter must be cleaned periodically. If dust accumulates on the fan and heat sink, it can cause overheating of the inverter.

11.3 Measurement Method for I/O Voltage, Current, and Power

General measuring instruments for I/O voltage, current, and power are indicated below. The voltage to be measured is the fundamental wave effective voltage and the power to be measured is the total effective value.

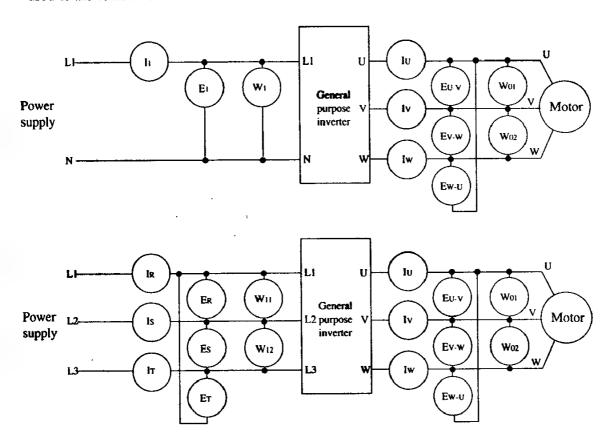


Table 3 Parts to be measured

14		Γ		 	
Measurement item	Parts to be measured	Me	easuring instrument	Remarks	Reference value
Supply voltage E ₁	Between L1 and L2, L2 and L3, L3 and L1 (ER) (Es) (ET)	*	Moving-iron type voltmeter or rectifier type voltmeter	Fundamental wave effective value	Commercial supply voltage 1ø 200 V class 220-240 V, 50/60 Hz 3ø 400 V class 380-415 V 50 Hz 400-460 V 60 Hz
Supply current I ₁	L1, L2, L3 (IR)(IS)(IT)	\$	Moving-iron type ammeter	Total effective value	
Supply power W ₁	Between L1 and L2, L2 and L3 (W11)(W12)		Electrodynamic type wattmeter	Total effective value	
Supply power factor Pf	Calculate the supply power supply current I_1 and suppl $Pf_1 = \frac{W_1}{\sqrt{3} \cdot E_1 \cdot I_1} \times 100(9)$	·			
Output voltage E ₀	Between U and V, V and W, W and U (EU)(EV)(EW)	*	Rectifier type voltmeter	Total effective value	
Output current	U, V, W (Iu)(Iv)(Iw)	\$	Moving-iron type ammeter	Total effective value	
Output power W ₀	Between U and V, V and W(W01)(W02)		Electronic type wattmeter	Total effective value	
Output power factor Pf ₀	Calculate the output power and output power W. $Pf_0 = \frac{W_0}{\sqrt{3} \cdot E_0 \cdot I_0} \times 100(\%)$		m the output voltage E,	output current I,	

- NOTE 1: Use a meter indicating a fundamental wave effective value for voltage, and meters indicating total effective values for current and power.
- NOTE 2: The inverter output waveform is a distorted wave, and low frequencys may cause errors. However, the measuring instruments and methods indicated above provide comparatively accurate values.
- **NOTE 3:** A tester (general purpose) may not be suited often to measurement of a distorted wave.

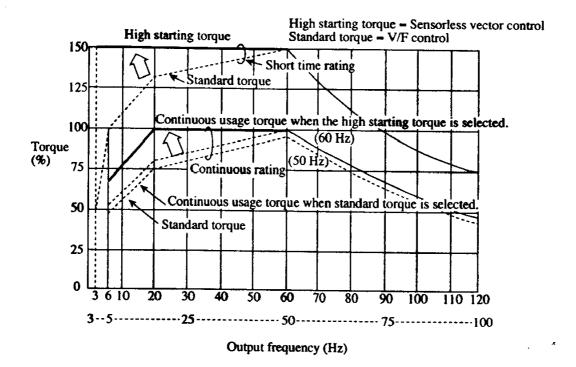
12. STANDARD SPECIFICATIONS

Model designation		J100- 004SFE5	J100- 007SFE5	J100- 015SFE5	J100- 022SFE5	J100- 015HFE5	J100- 022HFE5	J100- 037HFE5		
Protective structure (NOTE 1)		IP20								
Over voltage category					Ш					
Maximum motor size (4P, kW)(NOTE 2)		0.4	0.75	1.5	2.2	1.5	2.2	3.7		
Maxim capacit	7/0 V	1.1	1.9	2.9	4.0					
(kVA)	240 V	1.2	2.1	3.1	4.4					
	400 V					2.6	3.7	6.0		
	460 V					2.9	4.0	6.5		
Input sur	oply phase	Single-pl	nase				Three-phase, 3 wire, earthed neutral			
Rated in	put AC voltage (V)			, 50/60 Hz 50/60 Hz ±	380 to 415/400 to 460 V ±10%, 50/60 Hz ±5%					
Rated ou	tput voltage (V) (NOTE 3)	Three-phase 220 to 240 (Corresponds to input voltage.)				Three-phase 400 to 460 (Corresponds to input voltage.)				
Rated in	put current (A)	6	10	15	21	5	7	11		
Rated ou	tput current (A)	3	5	7.5	10.5	3.8	5.3	8.6		
Output f	requency range (NOTE 4)	0.5 to 360 Hz								
Frequence	cy accuracy	±0.01% of the maximum frequency Analog ±0.2% (25 ±10°C)								
Frequenc	cy setting resolution	0.01 Hz								
Voltage/	Voltage/frequency characteristics		V/F any type possible, High starting torque, standard starting torque (constant torque, reduced torque)							
Overload	Overload current capacity		150%, 60 seconds							
Acceleration/deceleration time		0.1 to 999 seconds, individually set (independent settings from 0.1 to 2999.9 seconds are possible when the remote operator is used.)								
Starting torque (NOTE 5)		150% or more (3 Hz)								
Braking Dynamic braking (NOTE 6) Feedback to capacitor		Арргох. 20%								
:	Dynamic braking using external regenerative resistor	150%			100%					
	DC injection braking	Braking is ON at the min. frequency or lethe remote operator. (Min. frequency, operate force can be set.)								

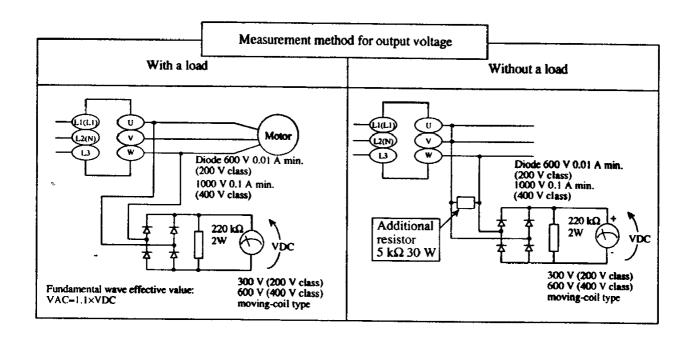
Model designation			J100- J100- <td< th=""></td<>							
Input signals	Frequency setting	Digital operator	Settings with							
	_	External signals	0 - 5 VDC (nominal), 0 - 10 VDC (nominal) (Input impedance 30 k Ω) 4 - 20 mA (nominal) (Input impedance 250 Ω) Potentiometer: 500 Ω to 2 k Ω (2 W) Variable resistor							
	Forward/ reverse	Digital operator	RUN/STOP switch (The forward run (FW) when shipped from the factory)							
	run, stop	FW command	FW/STOP							
	Intelligent	input terminal	REV: Reverse run command CF1: Change of multi-stage first speed CF2: Change of multi-stage second speed CF3: Change of multi-stage third speed DB: External DB input STN: Initial setting SET: Change of second setting function 2CH: Change of 2 accel/decel speed FRS: Free run input EXT: External trip terminal USP: USP function RS: Reset SFT: Software lock input							
	Intelligent	output terminal	AR: Frequency arrival signal RUN: RUN signal OL: Overload previous notice siganl							
Output signals	Frequency	monitoring	Analog meter (0 - 10 VDC 1 mA full-scale) Selection of the digital frequency signal or analog output current monitor.							
Fault alarm contact			ON when the inverter is abnormal (1c contact)							
Other characteristics			Change of V/F patter, curve accel/decel, upper/lower limiter, output curren signal, DC voltage monitoring, output frequency display, trip history monitoring (memorable up to 3 times), etc.							
Protection functions			Overcurrent, overvoltage, undervoltage, electronic thermal, temperature abnormality, ground fault overcurrent upon starting, overload limit							

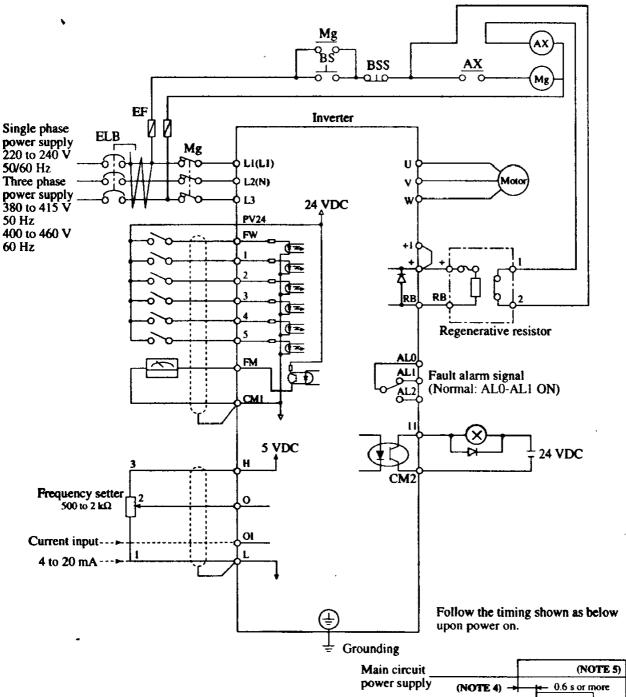
Model designation		J100- 004SFE5	J100- 007SFE5	J100- 015SFE5	J100- 022SFE5	J100- 015HFE5	J100- 022HFE5	J100- 037HFE5		
General specifi- cations	Ambient temperature	-10 to 40 (-10 to 50	-	over remov	-10 to 40°C -10 to 50°C (with cover) (without cov					
	Humidity	20 to 90% RH (no dew condensation)								
	Vibrations	5.9 m/S ² (0.6G) 10 - 55 Hz								
	Operation location	1,000 meter or less altitude, indoors (no corrosive gas or dust)								
	Paint color	Gray								
Options		reactor for	perator, co r improvin ction of ele	g power fa	ble for digi	tal operator, filter for inv	, regenerativerters, L ty	ve resistor, pe fitting		
Estimated mass (kg)		1,3	1.6	3.3	3.4	3.3	3.4	3.4		

- * With use of a remote operator or a digital operator, the functions can be expanded. See Chapter 13.
- **NOTE 1:** Protective structure is based upon JEM1030 (1977).
- NOTE 2: The applicable motor is a Hitachi standard four-pole motor. When using another motor, make sure that the rated motor current does not exceed the rated inverter current.
- NOTE 3: The output voltage will decrease if input voltage decreases.
- NOTE 4: Confirm with the motor manufacturer the motors maximum rpm when using a motor running at frequency higher than 50/60 Hz.
- NOTE 5: When using the Hitachi standard four-pole motor running at frequency higher than 50/60 Hz.
- NOTE 6: Torque will be reduced when the base frequency exceeds 50/60 Hz.



NOTE: Using the Hitachi standard four-pole motor



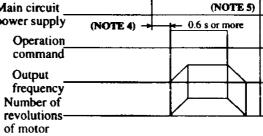


NOTE 1: Common terminal for each terminal is different.

Terminal name	FW, 1, 2, 3, 4, 5	FM	H, O, OI	11
Common	PV24	CM1	L	CM2

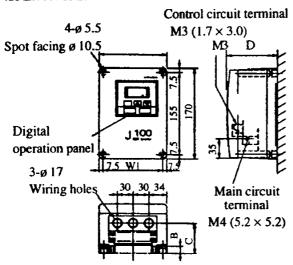
NOTE 2: The regenerative resistor has a temperature sensor.

When it works, turn off power supply to the inverter or set the deceleration time longer.



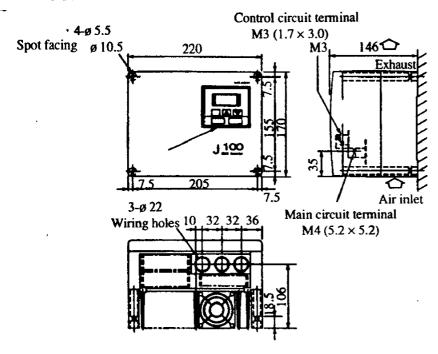
NOTE 3: When the operation command is input first and the main circuit power is turned ON, a direct start results and a trip occurs.

- NOTE 4: Do not input the operation command simultaneously when the main circuit is turned on.
- **NOTE 5:** Do not turn OFF the main circuit power during running.

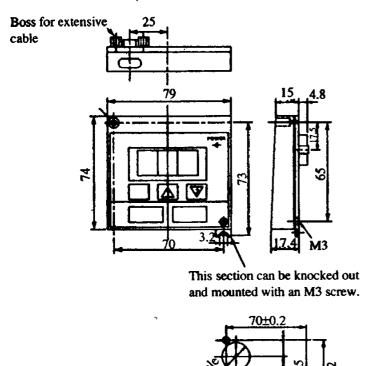


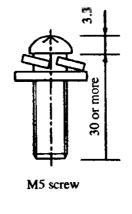
	W	Wı	D	C	В
J100-004SFE5	128	113	93	55	14.5
J100-007SFE5	145	130	103	69	18.5

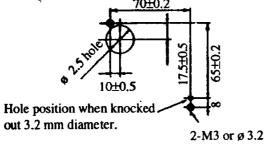
J 100-015SFE5/022SFE5/015HFE5/022HFE5/037HFE5



Digital operator



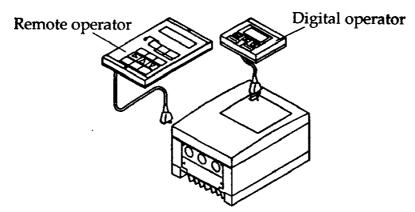




13. FUNCTIONS WHEN USING THE OPTIONAL REMOTE OPERATOR

13.1 Connecting the remote operator

Be sure to turn the power supply off when connecting the connector.



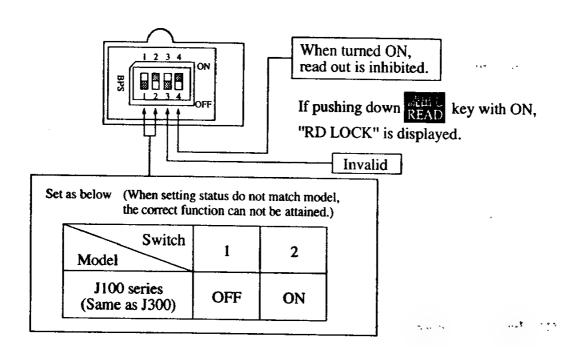
- (1) Insert the connector straight into the remote operator and inverter unit printed-circuit board.
- (2) Turn on the power supply.
- (3) Make sure that the liquid crystal display of the remote operator is lit.

When the power supply of the inverter is turned on, FS000.0..... of the monitoring mode will be displayed. If, however, any of the following is displayed when the inverter is turned off, they will be displayed when power is turned on again.

• Frequency setting, multi-speed setting or other frequency displays, motor rotational speed display, frequency conversion display, or output current display.

NOTE: See the operation manual of the remote operator for instructions.

In addition, see the following pages for details on its various functions. Set the dipswitches mounted on the backside of the remote operator and copy unit as below.



Monitoring mode displays (when the remote operator is used)

Y: Setting can be changed during operation

N: Setting can not be changed during operation

- : Display only

Display sequence	Monitor name	Display content	Standard setting	Setting range	Setting and change are possible?	Remarks
1	Frequency setting and output frequency	FS00.0 000.0Hz	000.0	000.0 to 375.0	Y	(1) displays the setting. (2) displays the
	(1S005.0 000.0Hz	0.000			output. • :::: is displayed
	Multistage-speed setting and out- put frequency	2S020.0 000.0Hz	0.000			when run instruction is ON. F: Forward run R: Reverse run
	put irequency	3S040.0 000.0Hz	0.000			
		4S000.0 000.0Hz				Displayed during
	Expansion	5S000.0 000.0Hz	000			multistage operation.
	multistage speed	6S000.0 000.0Hz			ļ	
		7S000.0 000.0Hz				
2	Acceleration time setting	ACCEL-1 0010.0S	10.0 (15.0)	0.1 to 2999.9	Y	
3	Deceleration time setting	DECEL-1 0010.0S	10.0 (15.0)	0.1 to 2999.9	Y	
4	2-stage acceleration time setting	ACCEL-2 0010.0S	10.0	0.1 to 2999.9	Y	
5	2-stage deceleration time setting	DECEL-2 0010.0S	10.0	0.1 to 2999.9	Y	
6	Frequency setting command	F-SET-M Terminal	Terminal	Remote Terminal	N	REMOTE: Setting from the remote operator
7	Operation command method	F/R-SW Terminal	Termina!	Remote Terminal	N	TERMINAL: Setting from the inverter terminal
8	Revolution speed display	RPM 4P 00000RPM	4	2 to 48	Y	Synchronized speed display
9	Output current display	1f A Im000.0%	_	1.5 to 23	Y	(1) displays the rated current of the inverter (2) displays output current
10	DC voltage display	PN-V 000V	-	-	_	
11	Manual torque boost adjustment	V-Boost Code<11>	11	00 to 99	Y	
12	Output voltage gain adjustment	V-Gain 100%	100	50 to 100	Y	Ź
13	Analog meter adjustment	M-ADJ 72	72	01 to 99	Y	
14	Failure display	# ? ERROR Over V.	_		_	#: Normal operation, Alarm content takes precedence over all other displays.
15	Trip history monitor	? ERR COUNT 000	-	_	-	Displays three alarms of the past (Voltage and current upon alarm)

0.5 N·m (max. 0.7 N·m)

NOTE: When data is changed, be sure to press the key. (Otherwise, the changed data may not be stored.)

The following functions can be obtained with connection of J-100-series to the remote operator (DOP) or the copy unit (DRW). However, selection is limited within the terminal functions.

Function mode

Display se- quence	No.	Function name	Display (Function	content mode 2)	Standard setting	Setting range	Remarks
1	F-00	V/F pattern setting	CONTROL	VF	VF	SLV1, SLV2 or VF	High starting torque (SLV1, SLV2) standard starting torque (VF)
2	F-01	Maximum frequency adjustment	+Fmax.	000.0 Hz	0	0 to 15 (Hz)	Adjustment against the maximum frequency set at F-00
3	F-02	Start frequency adjustment	<u>F</u> min.	000.5 Hz	0.5	0.5 to 5.0 (Hz)	
4	F-03	Maximum frequency limiter setting	<u>H</u> -LIM-F	000.0 Hz	0	0 to 375 (Hz)	Set the maximum and minimum set frequency.
5	F-04	Minimum frequency limiter setting	<u>L</u> -LIM-F	000.0 Hz	0	0 to 375 (Hz)	Both F03 and F04 are 0. : Not valid
6	F-05	Multistage-speed first speed setting	Speed-1	000.0 Hz	0	0 to 375 (Hz)	Setting the multistage speed Control circuit terminal Set
7	F-06	Multistage-speed second speed setting	Speed-2	000.0 Hz	0	0 to 375 (Hz)	1 2 3 frequency ON OFF (1S) F-05 OFF ON OFF (2S) F-06
8	F-07	Multistage-speed third speed setting	Speed-3	000.0 Hz	0	0 to 375 (Hz)	ON ON (3S) F-07 ON OFF (4S) F-08 OFF ON (5S) F-09
9	F-08	Multi-stage-speed fourth speed setting	Speed-4	000.0 Hz	0	0 to 375 (Hz)	OFF ON ON (6S) F-10 OFF OFF (7S) F-11
10	F-09	Multistage-speed fifth speed setting	Speed-5	000.0 Hz	0	0 to 375 (Hz)	
11	F-10	Multistage-speed sixth speed setting	Speed-6	000.0 Hz	0	0 to 375 (Hz)	
12	F-11	Multistage-speed setting	Speed-7	000.0 Hz	0	0 to 375 (Hz)	
13	F-12	DC braking frequency adjustment	E-DCB	000.5 Hz	0.5	0.5 to 375 (Hz)	Set the starting frequency to perform DC braking.
14	F-13	DC braking force adjustment	V-DCB	000	000	000 to 020	Set the DC braking force Maximum is at 020.

DC braking time adjustment Electronic thermal level adjustment Acceleration selection (Linear, S-curve) Deceleration selection (Linear, S-curve) External frequency setting start External frequency setting end		000.0 S 100% Linear Linear	100 (%) Linear	00 to 600 (S) 120 to 20 (%) Linear S-curve	Set the DC braking time. If 0 is set, no DC braking.
level adjustment Acceleration selection (Linear, S-curve) Deceleration selection (Linear, S-curve) External frequency setting start External frequency	ACCline DECline E-START	Linear Linear	Linear	Linear S-curve	
(Linear, S-curve) Deceleration selection (Linear, S-curve) External frequency setting start External frequency	DECline F-START	Linear	Linear	S-curve	
(Linear, S-curve) External frequency setting start External frequency	DECline E-START		Linear		
setting start External frequency		000.0 Hz	0 (Hz)		
	E-END			0 to 375 (Hz)	Set the relationship of the output frequency against the frequency
	<u> L</u>	000.0 Hz	0 (Hz)	0 to 375 (Hz)	setting from the terminal. F-START: Minimum set frequency F-END: Maximum set frequency
	<u>s</u> witchi	DCB OFF		DCB ON/OFF	① DC braking Yes/No
	<u>S</u> WITCH1	FM ANA		FM ANA/DIG	② Frequency monitor: Analog meter/Digital meter
	<u>S</u> WITCH1	SWITCH1 fmax 120		Imax 120/360	3 Switch the maximum frequency 120/360 Hz
Switch selection 1	<u>s</u> witchi	PWER ALM	See the	PWER ALM/ZST	Trip/Retry function (Restart upon undervoltage) (*2)
	SWITCHI	DIOP FWD	ien	DIOP FWD/REV	Switch the motor revolution direction with the digital operato
	<u>s</u> witch1	FWD ON		FWD ON/OFF	© Direction of the motor revo- lution ON/OFF (Forward)
	SWITCH 1	REV ON		REV ONOFF	⑦ Direction of the motor revo- lution ON/OFF (Reverse)
	SWITCH1	OLMT ON		OLMT ONOFF	Overload limiter
		SWITCHI	SWITCH1 FWD ON SWITCH1 REV ON SWITCH1 OLMT ON	SWITCH1 REV ON	SWITCH1 REV ON REV ON/OFF

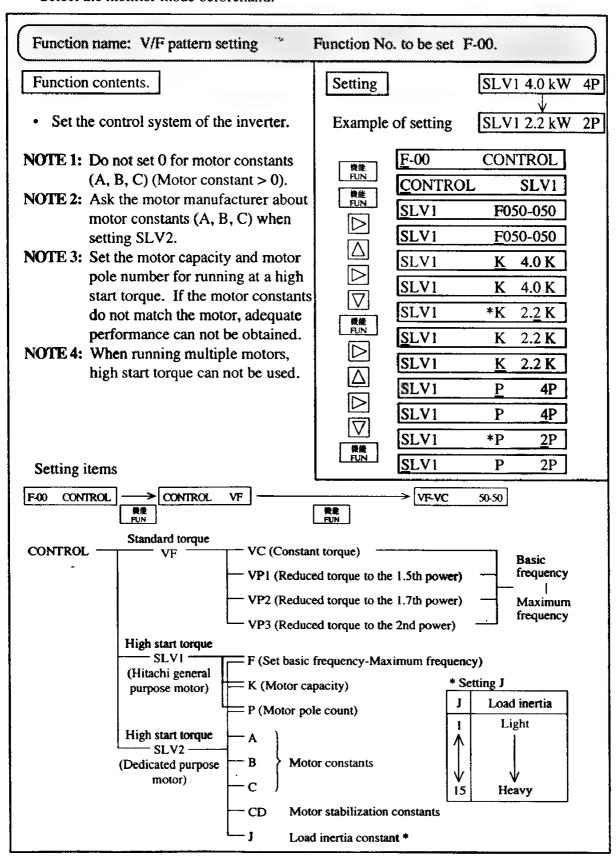
Display se- quence	No.	Function name	Displa (Function	y conte on mode	nt e 2)	Standard setting	Setting range	Remarks
			SWITCH2	DB	LVL		DB EDG/LVL	DC braking edge/level selection
			SWITCH2	STOP	ON		STOP ON/OFF	2) STOP key is effective wher external run is selected.
			SWITCH2	Ethm	100		Ethm 000/100	3) Electronic Thermal relay is selected.
			SWITCH2	SLOK	OFF		SLOK OFF/ON	4) Setting frequency in software lock (Invalid from the terminal)
22	F-21	Switch selection 2	<u>S</u> WITCH2	AIN	5V		AIN 5V/10V	Setting voltage for analog input. NOTE: Even if either VOL or CUR is selected, the total output frequency of both analog input signals is displayed.
			SWITCH2	AIN	TER	See the	AIN TER/PAN	6 Be sure to select TER.
			SWITCH3	SOFT	FREE	left	SOFT LOCK/FREE	Data is changed or not. (* 3)
23	F-22	Switch selection 3	SWITCH3	FARV	2		FARV 1/2	2) Selection of frequency arrival (2: Set frequency 1: Any frequency)
			SWITCH3	TRIP	OFF		TRIP OFF/ON	3 Selection of neglect of undervoltage trip upon stop
			SWITCH3	DEBG	OFF		DEBG OFF/ON	4) Must be OFF.
			SWITCH3	TCNI	CNT		CNT/CLR	Trip history clear selection
24	F-23	Switch selection 4	SWITCH4	MON	FM		MON FM/CUR	Monitoring selection FM: Frequency monitoring CUR: Current monitoring
			<u>s</u> witch5	RUN	1		RUN 1/2	1: Output during operation 2: Output during operation and DC braking
25	F-24	.24 Switch selection 5	<u>S</u> WITCH5	AVR	ON		AVR ON/OFF	2) AVR value delection for deceleration ON: The AVR value is the same as the V-SET value. OFF: An optional AVR value can be delected by DEC-V
			SWITCH5	LAD	ON		LAD ON/OFF	3) LAD stop function selection ON: LAD stop sunction (*4) OFF: No LAD stop function
		:	SWITCH5	RVS (ON		RVS ON/OFF	4) Reduced voltage start ON/OFF

Display se- quence	No.	Function name	Display (Function	content mode 2)	Standard setting	Setting range	Remarks
26	F-25	Overload limiter constant setting	LM.CONS	150%01.0	150 (%) /1.0		Set the overload limit level and deceleration time
27	F-26	Allowable under- voltage time setting	IPS-T	001.0 S	1.0 (S)	0.3 to 3.0 (S)	
28	F-27	Standby time after undervoltage setting	<u>I</u> PS-R-T	0 010.0 S	10.0 (S)	0.3 to 100.0 (S)	
29	F-28	Dynamic braking usage ratio setting	BRD-%ED	05.0%	5.0 (%)	0.1 to 31.0 (%) (* 6)	Set the allowable usage ratio of regenerative resistor to over 100 seconds
30	F-29	Frequency arrival setting	SPD-ARV	ACC100%	ACC 100%	ACC or DEC 0 to 100 %	Rate to the maximum frequency which is set in Item F-00 or F-01
31	F-30	Carrier frequency setting	CARRIER	16 kHz	16	5, 8, 12, 16 (kHz)	
32	F-31	Input voltage setting	V-SET	220V	220 (380)	200, 220, 230, 240 V [380, 400, 415,]	Set the motor voltage (* 7)
<u></u>				· · ·		440, 460, 480	
33	F-32	AVR voltage selection for deceleration		220V	220 (380)	200, 220, 230 240, 250, 270 000 V [380, 400, 415, 440, 460, 480, 500, 540, 000]	This is effective when AVR OFF is selected in Item of Switch selection 5. *When AVR OFF is selected, the cursor will not move. (* 7)
34	F-33	Jump frequency 1	JUMP-FI	000.0Hz	0	0 to 375 (Hz)	Up to 3 locations can be set. 0 means invalid.
35	F-34	Jump frequency 2	JUMP-F2	000.0Hz	0	0 to 375 (Hz)	
36	F-35	Jump frequency 3	JUMP-F3	000.0Hz	0	0 to 375 (Hz)	
37	F-30	Jump frequency	JMP-WID	0.5Hz	0.5	0 to 9.9 (Hz)	
38	F-3	Overload previous notice level	OLalarm	150%	150	50 to 150 (%)	ON level of overload previous notice signal
39	F-3	Input terminal 1	<u>I</u> N-TM I	CF I			REV: Reverse running command
	ting	Input terminal 2	<u>I</u> N-TM 2	CF 2		REV/CF1/CF2 CF3/DB/STN	CF1: 1st multispeed switching CF2: 2nd multispeed switching
	al set	Input terminal 3	JN-TM 3	2CH	Same as		CF3: 3rd multispeed switching DB: External DB input
1	mim	Input terminal 4	IN-TM 4	RS		SFT	STN: Initialization SET: 2nd setting function
	put te	Input terminal 5	IN-TM 5	REV			switching 2CH: 2-stage acceleration and deceleration switching
	inal in	Input terminal 1 NO/NC setting	IN-TM C)/C-1 NO			FRS: Free run input EXT: External trip terminal
	Intelligent terminal input terminal setting	Input terminal 2 NO/NC setting	IN-TM C)/C-2 NO	_		USP: USP function RS: Reset input SFT: Software lock input
	ıtellige	Input terminal 3 NO/NC setting	<u>I</u> N-TM ()/C-3 NO	NO	NO/NC	NO: a contact NC: b contact When the corresponding
	=	Input terminal 4 NO/NC setting	IN-TM C)/C-4 NO			When the corresponding terminal is the [RS] terminal, only the NO operation is per-
		Input terminal 5 NO/NC setting	IN-TM (D/C-5 NO			formed. (Even when NC is set, * display remains but the sett- ing is returned to NO.)

Display se- quence	No.	Function name	Display content (Function mode 2)	Standard setting	Setting range	Remarks
40	F-39	Output terminal 11	OUT-TM 1 AR	AR	AR/RUN/OL	AR: Speed arrival signal RUN: During on-line signal
	Intelligent terminal output terminal setting	Output terminal 11 NO/NC setting	OUT-TM O/C-1 NC	NC	NO/NC	OL: Overload previous notice signal NO: a contact NC: b contact
	Intelliger output te	Alarm output NO/NC setting	OUT-TM O/C-A NC	NC		
41	F-40	External frequency command input sampling count setting	<u>S</u> AMP-F 08	08	1 to 8 (times)	When the frequency is low, the external frequency command may malfunction due to noise.

- (*1) In the case of standard setting, up to 135 Hz (120 Hz + 15 Hz) can be set. When (3) the maximum frequency to be switched by Switch Selection 1 in the standard mode F-20 is set to 360 Hz, up to 375 Hz (360 Hz + 15 Hz) can be set.
 - When a high frequency is to be selected, please sufficiently examine the mechanical strength of the motor and load. Particularly the general purpose motor is designed at 50 or 60 Hz. Therefore, when the running frequency is more than it, contact the manufacturer of motor beforehand.
- (*2) In the case of retry, the starting frequency is 0.
- (*3) Even in the enabled state, when the software lock terminal [SFT] is on, the equipment is in the disabled state.
- (*4) When the current becomes more than 150% of the rating of load current, the acceleration and deceleration will be halted.
- (*5) When the deceleration time is set to 31.0 by F-25 LM CONS, this function will not be performed.
- (*6) When F-28 BRD-%ED is set to 31%, the damping circuit will not be operated.
- (*7) When F-24 switch 5 AVR is ON, the value of F-32 DEC-V is forcibly set to the value of F-31 V-SET.

- · Function mode operation when using the remote operator
 - 1. After data is changed, be sure to push down the street key.
 - 2. Change data when the inverter is stopped. No data can be changed when the inverter is tripped and stopped.
 - 3. In the function mode, the motor can not be started running. Select the monitor mode beforehand.

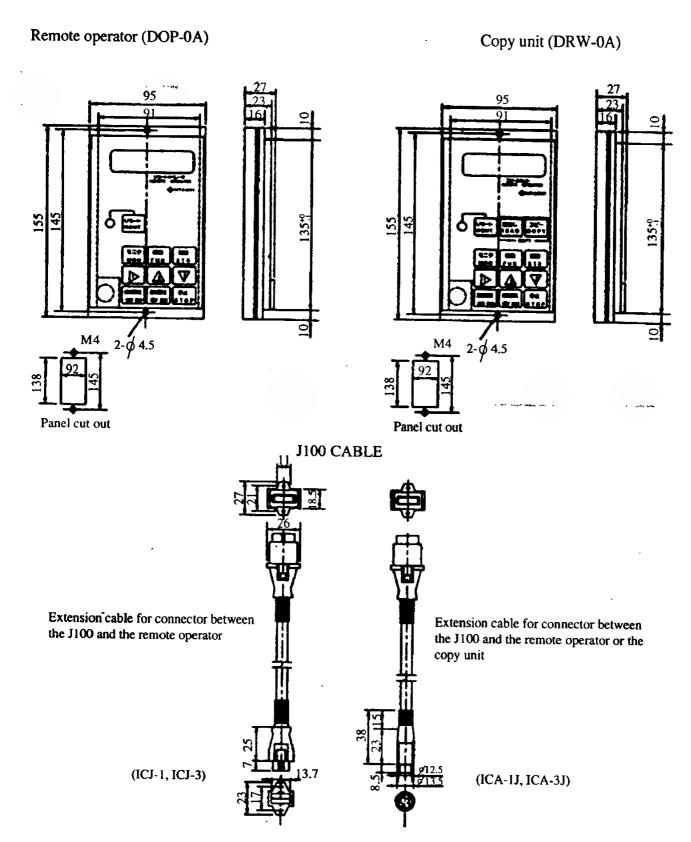


Protective function displayed when using the remote operator

Description	Contents		Display
Power module	When output of an inverter is short circuited or the motor is locked, a large current flows through the	Constant speed	PM. Drive
protection	inverter and causes a fault. When the current flowing through the power module or a temperature abnormal-	Dec.	PM. Decel
	ity of the main devices comes to certain level, the output	Acc.	PM. Accel
	is cut off.	Stop	PM. ERR
Over- current	The output current of the inverter is detected. When it exceeds the specified value, the output is turned off.	Constant speed	OC. Drive
protection (NOTE1)		Dec.	OC. Decel
		Acc.	OC. Accel
		Stop	OC. ERR
Overload protection (NOTE1)	When a motor overload is detected the inverter's built in the detects it and the output of the inverter is cut off.	nermostat	Over. L
Braking resistor overload	When regenerative braking resistor exceeds the usage time overvoltage caused by the stop of the BRD function is deteroutput of the inverter is cut off.	OL. BRD	
Over- voltage protection	When the converter voltage exceeds a certain level due to renergy from the motor, this protection function engages, are of inverter is cut off.	Over. V	
	This is an error display when the voltage supplied to the inceeds the specified value.	OV. SRC	
EEPROM error	When the memory built in has problem by noise and exces ture rise, protective function works and output of inverter	EEPROM	
Under- voltage protection	A decrease of the input voltage of an inverter results in important tion of the control circuit. It also generates motor heat and torque. Output is cut off when the input voltage goes down to less	Under. V	
CT error	160V (200V class), 300 to 320V (400V class). When a large noize source is near the inverter or an abnorr on built-in CT, the output of the inverter is cut off.	nality occurs	CT
CPU error	Malfunction or abnormality on built in CPU and the outpu inverter is cuts off.	t of the	СРИ
External trip	An abnormality signal from external equipment cuts off the inverter. (When the external trip function is selected)	e output of the	EXTERNAL
USP error	It indicates an error when power is turned on while the invrun. (When USP function is selected)	USP	
Ground fault protection	The inverter is protected by detection of ground fault betw inverter output and the motor upon power on. There may be the possibility of power module failure.	een the	GND Flt

NOTE 1: If a trip occurs, press the reset key after an elapse of 10 seconds to restore the inverter.

Dimension (unit:mm)



NOTE 1: Shape of the cable for the J100 series is different from that of the VWS3A and VWA. Only the cable can be provided when changing the cable.

Copy unit function

Ор	Operation example (Procedure to transfer the data of inverter A to B,C, and D inverters)						
Se- quence	Operation	Key	Operation result				
1	Set data is read out from the inverter A (It is stored into the memory.	読出し READ	Inverter A Copy unit				
2	Turn off the power supply to inverter A and remove the cable.						
3	Connect the cable to inverter B and turn on the power.						
4	Copy data stored in the copy unit is written to inverter B.	コピー COPY (* 1)	Data copy				
5	Cut off the power supply to inverter B. (* 1)		Inverter B Inverter C Inverter D				
6	Perform the above processes from 3 to 5 sequentially for inverters C and D. That is, the same process as at for inverter B.		1755 1755 1755 1755 1755 1755 1755 1755				

	Operation example (Process to char	nge and transfer	to inverters B, C and D)	
1	Connect the cable and press the remote key. Change the data of the inverter with copy unit.	E= 身 職能 配備 MON FUN STR	Data change Copy unit	J200
2 to 6	Read out the data from inverter A (It is stored into the memory area of the copy unit). The following procedures are the same those of the operation 1. Change the data setting first.	読出し READ	J ₂ 200 Inverter A	Copy unit

*1 When pressing any key or resetting the unit after the COPY key is pressed, be sure to wait for at least six seconds. (When any key is pressed, the unit is reset, or the power is turned off within six seconds, the data may not be copied.)

- NOTE 1: The following settings cannot be copied by the copy function. Note that the current set data is saved as it is.
 - Monitor mode

Analog meter adjustment

Trip history monitor

(Counts of latest three alarms)

- Function mode
 - F-23 Switch selection 4
 - F-24 Switch selection 5
 - F-32 AVR voltage selection for deceleration
 - F-33 Jump frequency 1
 - F-34 Jump frequency 2
 - F-35 Jump frequency 3
 - F-36 Jump frequency width
 - F-37 Overload previous notice level
 - F-38 Intelligent input terminal setting
 - F-39 Intelligent output terminal setting
 - F-40 Setting of exterminal frequency command sampling times
- NOTE 2: Do not copy the setting from the 200 V class to the 400 V class or from the 400 V class to the 200 V class. (When the setting is copied to a different voltage class by mistake, reset F-31 V-SET (motor voltage setting).)
- **NOTE 3:** Do not copy the setting from the Japanese version to the European or American version or from the European or American version to the Japanese version.
- NOTE 4: When the V/f control setting data is copied from a different capacity (for example, copied from J100-004SFE5 to J100-022SFE5), change the kW setting of F-00 CONTROL to the kW value of the applied motor.

14. SERVICE

When inquiring about inverter trouble, please be ready to inform the shop where you purchased your unit or the nearest service station the following.

- (1) Type
- (2) Purchased date
- (3) Manufacturing No. (MFG. No.)
- (4) Malfunction symptoms

If the contents are unclear due to an old nameplate, give only the clear items. To reduce the non-operation time, it is recommended to stock a spare inverter.

Warranty

The warranty period under normal installation and handling conditions shall be one (1) year after the date of delivery. The warranty shall cover the repair of only the inverter to be delivered.

- 1. Service in the following cases, even within the warranty period, shall be charged to the purchaser.
 - (a) Malfunction or damage caused by misoperation or remodelling or improper repair
 - (b) Malfunction or damage caused by a drop after purchase and transportation
 - (c) Malfunction or damage caused by fire, earthquake, flood, thunderbolt, or other natural calamities, pollution or abnormal voltage.
- 2. When service is required for the product at your worksite, all expenses associated with field repair shall be charged to the purchaser.
- 3. Always keep it handy. Please do not loose it. We are sorry but this manual can not be re-issued.

Appendix 1 J100 series data setting values

J100 series inverters provide many functions and their parameters can be set by the user. It is recommended to record the parameters that have been set by the user, in order to speed the investigation and repair in the event of a failure.

Inverter model	J100	This information is written on the
MFG. No.		nameplate located on the side cover of the inverter.

For the digital operator

Display sequence	Function name	Standard setting	Set value
F1	Setting frequency and output frequency		
F2	Setting output frequency	0.0	T.M.
F4	Direction of the motor revolution	F	
F5	Setting V/F pattern	08 (00)	·····
F6	Setting acceleration time	10.0 (15.0)	
F7	Setting deceleration time	10.0 (15.0)	
F8	Setting torque boost	11	· · · · · · · · · · · · · · · · · · ·
F9	Switch over of the digital operator and terminal mode	03	
F10	Analog meter adjustment	72	
F11	Setting input voltage	220 (380)	
F14	Setting extention function	0	

NOTE: The value in the parentheses is for 400 V.

(2) Extention Function Mode

Command display	Function name	Standard setting	Remarks
A 0	Control method	0	
A 1	Motor capacity setting	NOTE 1	
A 2	Motor poles setting	4	
A 3	Maximum frequency adjustment	0.0	
A 4	Start frequency adjustment	0.5	
A 5	Upper frequency limiter setting	0	
A 6	Lower frequency limiter setting	0	** " ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '
A 7	Jump frequency setting 1	0	
A 8	Jump frequency setting 2	0	
A 9	Jump frequency setting 3	0	
A10	Carrier frequency setting	16	· · · · · · · · · · · · · · · · · · ·
A11	Frequency command sampling setting	8	· ·
A12	Multispeed first speed setting	0	
A13	Multispeed second speed setting	0	
A14	Multispeed third speed setting	0	
A15	Multispeed forth speed setting	0	
A16	Multispeed fifth speed setting	0	
A17	Multispeed sixth speed setting	0	
A18	2-stage acceleration time setting	10.0	
A19	2-stage deceleration time setting	10.0	
A20	DC braking frequency setting	0.5	, to 18 to 1
A21	DC braking force adjustment	0	
A22	DC braking time adjustment	0	
A23	Electronic thermal level adjustment	100	
A24	Electronic thermial characteristic selection	1	
A26	External frequency setting start	0	
A27	External frequency setting end	0	
A28	Acceleration selection (Linear, S-curve)	0	
A29	Deceleration selection (Linear, S-curve)	0	
A30	Overload previous notice signal setting	150	
A31	Overload limit level setting	150	
A32	Overload limit content selection	0	
A33	LAD stop function setting	0	· · · · · · · · · · · · · · · · · · ·
A34	Trip/retry function selection	0	
A35	Trip ignorance selection	0	· · · · · · · · · · · · · · · · · · ·
A36	AVR voltage setting for deceleration	0	
A37	Motor voltage setting for deceleration	220 (380)	
A38	Dynamic braking usage ratio	5	
A39	Optional arrival frequency for acceleration	100	

Command display	Function name	Standard setting	Remarks
A 40	Optional arrival frquency for deceleration	100	**************************************
A41	Forward rotation	1	
A42	Reverse rotation	1	
A43	Stop key ON/OFF selection	0	
A48	Analog input selection	0	
A49	Frequency arival signal output method	2	
A50	Analog/digital meter selection	1	
A51	Frequency/current monitoring selection	0	
A52	RUN signal output selection	1	
A53	Enable/disable of frequency setting for software lock	0	
A55	DC braking ON/OFF selection	0	
A56	DC braking edge/level selection	1	,,,
A57	Trip history clear selection	0	
A58	Reduced voltage start selection	1	
A62	Base frequency setting	50	
A63	Maximum frequency setting	50	
A64	Maximum frequency switching	0	
A68	Jump frequency range setting	0.5	
A71	Multispeed seventh speed setting	0	
A80	Frequency command adjust. (voltage)	NOTE 2	
A81	Frequency command adjust.(current)	NOTE 2	
A82	Allowable undervoltage time setting	1.0	
A83	Undervoltage retry waiting time	10.0	
A84	Software lock selection	0	
A85	Deceleration rate setting for overload limit	1.0	
C0	Input terminal setting 1	1	
Cl	Input terminal setting 2	2	
C2	Input terminal setting 3	7	
C3	Input terminal setting 4	11	
C4	Input terminal setting 5	0	
C10	Output terminal setting	0	
C20	Input terminal a and b contact setting	00	
C21	Output terminal a and b contact setting	03	

NOTE 1: The most applicable motor capacity of the inverter is set.

NOTE 2: The initial setting of each inverter is adjusted when shipped from the factory.

NOTE 3: The value in the parentheses is for 400 V standard setting.

Appendix 2 J100 series data setting values (For the remote operator)

J100 series inverters provide many functions and their parameters can be set by the user. It is recommended to record the parameters that have been set by the user, in order to speed the investigation and repair in the event of a failure.

Inverter model	J100	This information is written on the
MFG. No.		nameplate located on the side cover of the inverter.

Monitor mode

NO.	Monitor name	Display content	Set value
1	Frequency setting	FS000.0 000.0Hz	
	and output frequency	1S005.0 000.0Hz	
	Multistage speed setting and output	2S020.0 000.0Hz	
	frequency	3S040.0 000.0Hz	
	(4S000.0 000.0Hz	······································
	Expansion multistage	5S000.0 000.0Hz	
	speed	6S000.0 000.0Hz	
		7S000.0 000.0Hz	
2	Acceleration time setting	ACCEL-1 010.0S	
3	Deceleration time setting	DECEL-1 010.0S	
4_	2-stage acceleration time setting	ACCEL-2 010.0S	
5	2-stage deceleration time setting	DECEL-2 010.0S	
6	Frequency setting command	F-SET-M Terminal	
7	Operation command method	F/R-SW Terminal	
8	Revolution speed display	RPM 4P 00000RPM	
9	Output current display	If A Im000.0%	
10	DC current display	PN-V 000V	
11	Output voltage gain adjustment	V-Boost Code <11>	,
12	Output voltage gain adjustment	V-Gain 100%	
13	Analog meter adjustment	M-ADJ 72	
14	Trip display	#	
		?ERROR Over V.	In case of over voltage tripping
15	Trip history	?ERR COUNT 000	

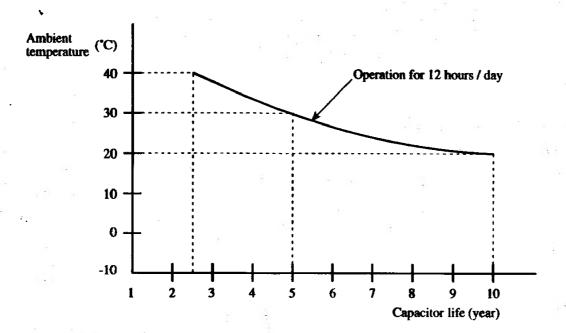
NOTE: The value of 400 V class is 15.0s.

Function mode

Display sequence		Function name	Standard setting	Set value
F-00	V/F patte	ern setting	V/F-VC 050-050	, <u>,</u> ,
F-01	Maximu	n frequency adjustment	030-030	
F-02	Start free	uency adjustment	0.5	 · · •
F-03	Maximu	n frequency limiter setting	0.5	
F-04		n frequency limiter setting	ŏ	
F-05	Multistas	ge-speed first speed setting	0 (Hz)	
F-06	Multista	ge-speed second speed setting	0 (Hz)	·
F-07	Multista	ge-speed third speed setting	0 (Hz)	
F-08	Multistage-speed fourth speed setting		0 (Hz)	
F-09	Multistag	Multistage-speed fifth speed setting		
F-10	Multistag	Multistage-speed sixth speed setting		
F-11	Multistag	ge-speed seventh speed setting	0 (Hz) 0 (Hz)	
F-12	DC braki	ng frequency adjustment	0.5 (Hz)	
F-13	DC braki	ing force adjustment	0	
F-14	DC braki	ing time adjustment	0 (S)	
F-15		c thermal level adjustment	100 (%)	· · · · · · · · · · · · · · · · · · ·
F-16	Accelera	tion selection(Linear, Curve)	Linear	
F-17		tion selection(Linear, Curve)	Linear	
F-18	External	frequency setting start	0 (Hz)	
F-19	External	frequency setting end	0 (Hz)	
F-20		Set DC braking	DCB OFF	
		Switch of frequency monitor	FM ANA	
		Switch of the maximum frequency	fmax 120	
	Switch	Switch of trip and retry	PWER ALM	
	selec- tion 1	Switch of the motor direction when using the digital operator	DIOP FWD	
		Direction of the motor (Forward)	FWD ON	
	0	Direction of the motor (Reverse)	REV ON	
		Overload limiter	OLMT ON	
F-21		DC braking edge/level selection	DB LVL	
		Stop key is effective when external run is selected	STOP ON	
	Switch selec-	Selection of electronic thermal characteristic	Ethm 100	
	tion 2	Selection of software lock	SLOK OFF	
		Setting voltage for analog input	AIN 5V	
		Selection of analog input	AIN TER	
F-22		Selection of data change	SOFTFREE	
	Switch	Selection of frequency arrival	FARV 2	
	selec-	Selection of neglect of trip	TRIP OFF	
	tion 3	Debug mode display	DEBG OFF	
	<u> </u>	Trip history clear	TCNT CNT	
F-23	Switch	Monitoring selection	MON FM	
	selec- tion 4			
F-24	1	RUN signal output selection	RUN 1	
l - - ·	Switch selec-	AVR value selection for deceleration	AVR ON	
	tion 5	LAD stop function selection	LAD ON	•
	1	Selection of reduced voltage start	RVS ON	
F-25	Overload	limiter constant	150% 1.0	
F-26	Allowable undervoltage time		001.0S	
F-27	Stand by time after undervoltage setting		0010.08	
F-28	Dynamic	braking usage ratio setting	5.0	
F-29	Frequenc	cy arrival setting	ACC, DEC 100%	ACC DEC
F-30		requency setting	16 kHz	
F-31	Input vo	tage setting	220 V (380V)	
F-32	AVR vo	tage setting for deceleration	220 V (380V)	

Display sequence		Function name	Standard setting	Set value
F-33	Jump frequency 1		0	
F-34	Jump frequency 2		0	
F-35	Jump frequency 3		0	
F36	Jump frequency width		0.5	
F-37	Overload previous notice level		150%	
F-38		Input terminal 1	CF1	
		Input terminal 2	CF2	
4	*	Input terminal 3	2CH	
3		Input terminal 4	RS	· · · · · ·
	Intelligent terminal	Input terminal 5	REV	
4	input terminal setting	Input terminal 1 NO/NC setting	NO	
		Input terminal 2 NO/NC setting	NO	
l i		Input terminal 3 NO/NC setting	NO	
		Input terminal 4 NO/NC setting	NO	
		Input terminal 5 NO/NC setting	NO	
F-39	Intelligent terminal	Output terminal 11	AR	<u> </u>
		Output terminal 11 NO/NC setting	NC	
	output terminal setting	Tham output 140/14C setting	NC	
F-40	External frequency command input sampling count setting		08	

Appendix 3 Capacitor Life Curve



- * When the inverter is stored in the panel, the ambient temperature is the temperature in the panel.
- * The useful life of the inverter will shorten if proper ventilation is disturbed by the dust and dirt accumulated on the inverter. This is true even when the inverter is running at a normal operating temperature.